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THE

UNIVERSITY EXTENSION CENTER

IN

MILWAUKEE

Business
Engineering
Letters and Science
Liberal Education
Technical Institute
1931-1932

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JUL 1 1932
UNIVERSITY OF ILLINOIS

THE UNIVERSITY OF WISCONSIN
UNIVERSITY EXTENSION DIVISION
623 W. State Street Marquette 7051

BULLETIN OF
THE UNIVERSITY OF WISCONSIN

CALENDAR
1931-32

EVENING CLASSES

FIRST SEMESTER

September 14-19 incl.	Monday-Saturday	Registration days
September 21	Monday	Instruction begins
November 11	Wednesday	Armistice Day; legal holiday
November 26	Thursday	Thanksgiving Day; legal holiday
December 21-January 3 incl.		Christmas recess
January 25-29 incl.	Monday-Friday	Final examinations

SECOND SEMESTER

February 1-6 incl.	Monday-Saturday	Registration days
February 8	Monday	Instruction begins
February 22	Monday	Washington's birthday; legal holiday
March 21-26 incl.		Spring recess
May 30	Monday	Memorial Day; legal holiday
June 6-10 incl.	Monday-Friday	Final examinations

DAY CLASSES

FIRST SEMESTER

September 17, 18	Thursday, Friday, 9-11 a.m.; 2-4 p.m.	Registration days
September 21	Monday	Instruction begins
September 26	Saturday	Special examinations for removal of conditions
November 11	Wednesday	Armistice Day; legal holiday
November 26-29 incl.		Thanksgiving recess
December 21-January 3 incl.		Christmas recess
January 16	Saturday	Examinations for removal of conditions
January 25-30 incl.	Monday-Saturday	Final examinations

SECOND SEMESTER

February 4, 5	Thursday, Friday 9-11 a.m.; 2-4 p.m.	Registration days
February 8	Monday	Instruction begins
February 22	Monday	Washington's birthday; legal holiday
March 21-26 incl.		Spring recess
April 16	Saturday	Examinations for removal of conditions
May 30	Monday	Memorial Day; legal holiday
June 6-11 incl.	Monday-Saturday	Final examinations

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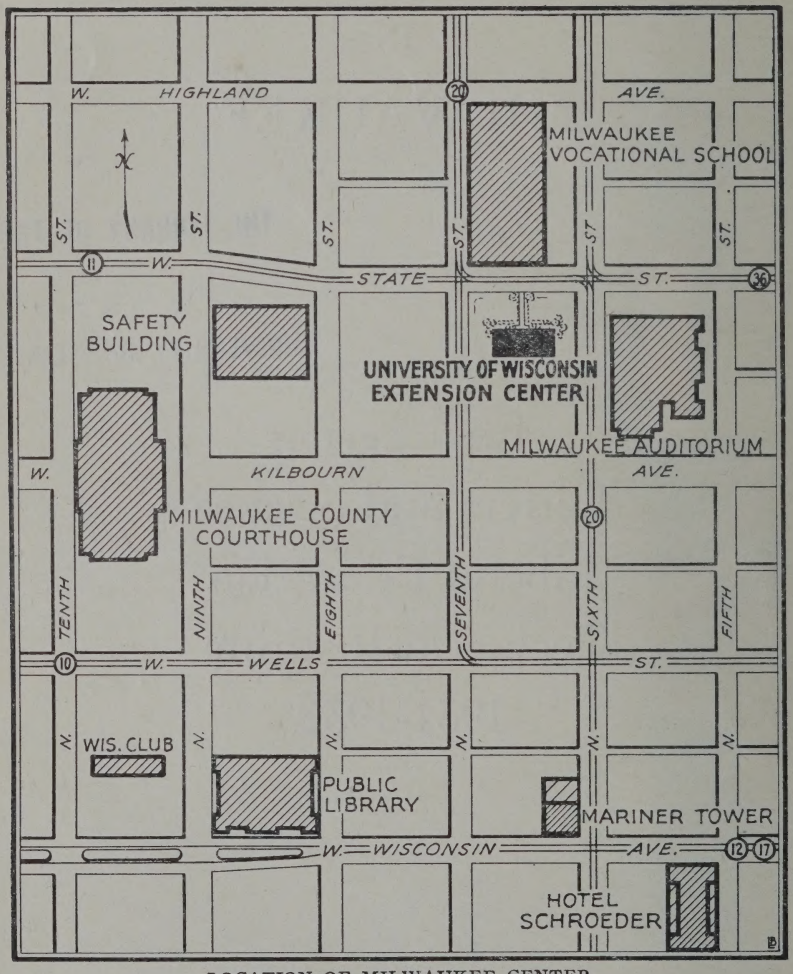

LOCATION OF MILWAUKEE CENTER

W75uZ ext
1931/32-
1955/56

UNIVERSITY EXTENSION CENTER, MILWAUKEE

General Administrative Staff

Glenn Frank, M.A., Litt.D., L.H.D., LL.D., President of the University
Chester D. Snell, B.H., B.S., Dean, University Extension Division
Malcolm G. Little, M.A., Assistant Dean, University Extension Division

Milwaukee Administrative Staff

Charles M. Purin, Ph.D., Director
Malcolm S. MacLean, Ph.D., Acting Assistant Director
Irene Langwill, B.A., Recorder
Florence C. Stehn, M.A., Adviser to Women

Harry T. Avey, M.E., Superintendent of Building
Nelson D. Conners, B.A., Field Representative, Lake Shore District

Milwaukee Office Staff

Elizabeth Lookatch, Secretary to Director
Helen O. Nuzum, B.A., Secretary to Assistant Director
Viola Schroeder, B.A., Assistant to Recorder

Lurlyn Williams, in Charge, Office Administration
Mathilda Buchstaller
Vanessa Orloff
Ruben Sy
Myrtle A. Volger
Gladys Wagner

Instructional Staff

Full-Time Faculty

Avey, Harry T., M.E., Assistant Professor of Mechanical Engineering
Axen, Florence L., M.A., Instructor in Mathematics
Babcock, Mary R., M.A., Instructor in English
Baldwin, Leo S., B.A., B.S., Assistant Professor of Drawing
Battig, Leon, M.A., Instructor in Mathematics
Blake, R. I., M.A., Instructor in English

Boughton, Donald C., M.S., Assistant Professor of Zoology
Brooks, Dudley C., M.A., Instructor in English
Creamer, John J., B.A., LL.B., Assistant Professor of English
Earls, Lester T., M.A., Instructor in Physics
Elliott, Ben G., M.S., M.E., Professor of Mechanical Engineering, Head of Engineering Courses
Fuller, William J., B.A., Associate Professor of Civil and Structural Engineering
Hale, Chauncey C., M.S., Instructor in Chemistry
Holmes, Mrs. Elisabeth K., B.A., Instructor in English
Hursley, Frank M., M.A., Assistant Professor of English
Jaeck, Elsa L., B.A., Librarian
Kramer, Edward N., M.S., Instructor in Chemistry
Krueger, Hilmar C., B.A., Instructor in History
Kunze, Harry L., M.A., C.P.A., Assistant Professor of Accounting, in Charge of Accounting Courses
Langwill, Mrs. Irene, B.A., Recorder
Leffler, George L., Ph.D., Instructor in Economics
MacLean, Malcolm S., Ph.D., Professor of English
Marden, Morris, Ph.D., Assistant Professor of Mathematics
Martin, Miles J., Ph.D., Associate Professor of Physics
Millington, Paul E., Ph.D., Assistant Professor of Chemistry
Parkinson, George A., Ph.D., Associate Professor of Mathematics
Pearson, Blenda M., M.A., Instructor in English
Phillips, R.M., M.A., Instructor in Speech
Purin, Charles M., Ph.D., Professor of German
Rasor, Eugene A., M.A., Instructor in Mathematics
Reinders, Victor A., M.A., Instructor in Chemistry
Rheineck, Alfred E., M.S., Instructor in Chemistry
Roth, William E., Ph.D., Assistant Professor of Mathematics
Rouse, T. Alton, Ph.D., Instructor in Physics and Mathematics
Sandy, Carol J., M.A., Instructor in French
Sawyer, Clair N., B.S., Instructor in Chemistry
Schnaitter, M. R., M.A., Associate Professor of Economics
Snead, Sam, Instructor in Radio Communication
Stehn, Mrs. Florence C., M.A., Instructor in French
Steinfort, Meta M., M.A., Associate Professor of Spanish
Strevey, Tracey E., Ph.D., Assistant Professor of History
Taylor, Carl, M.A., Assistant Professor of Speech
Torinus, Gracia E., M.A., Instructor in English
Town, George G., Ph.D., Associate Professor of Chemistry
Vass, John I., M.A., Instructor in Mathematics
Voigt, Mrs. Frieda, B.A., Instructor in German
Walker, Ruth I., Ph.D., Instructor in Zoology and Botany
Wesle, Herbert W., B.S., Assistant Professor of Topographic Engineering
Young, Charles E., Ph.D., Professor of Romance Languages

(For part time faculty list, 1930-31, see p. 111)

DEPARTMENTS

Business

H. R. English, M.A., Associate Professor of Business Administration
D. R. Fellows, M.A., Associate Professor of Business Administration
H. R. Doering, M.B.A., Assistant Professor of Business Administration
R. E. Ellingwood, M.S., Assistant Professor of Business Administration
Harry L. Kunze, M.A., C.P.A., Assistant Professor of Accounting, in Charge of Accounting Courses
James B. Read, B.A., LL.B., Lecturer in Real Estate
W. J. Schenck, B.A., C.P.A., Lecturer in Accounting
James A. Book, B.S., C.P.A., Instructor in Accounting
James Browning, M.A., LL.B., Instructor in Accounting
Clarence Chapelle, M.A., Instructor in Business Statistics
C. A. Holmes, Instructor in Salesmanship
J. C. Jacobsen, Instructor in Federal Income Tax
Floyd E. Jenkins, B.A., LL.B., Instructor in Business Law
Walter E. Rilling, B.A., Instructor in Accounting
W. A. Sheaffer, Ph.B., C.P.A., Instructor in Accounting
Mary Sobata, B.A., Instructor in Secretarial Training

Additional instructors to be appointed.

Engineering

Ben G. Elliott, M.S., M.E., Professor of Mechanical Engineering, Head of Engineering Courses
F. M. Dawson, M.C.E., Professor of Hydraulic Engineering
William J. Fuller, B.A., Associate Professor of Civil and Structural Engineering; Chairman of Building Design and Construction Department
R. J. Roark, M.S., Associate Professor of Mechanics
Harry T. Avey, M.E., Assistant Professor of Mechanical Engineering
Leo S. Baldwin, B.A., B.S., Assistant Professor of Drawing; Chairman of Drawing Department
C. D. Case, B.S., Assistant Professor of Mechanical Engineering
C. L. Dean, B.S., Assistant Professor of Mechanical Engineering
Russell W. Fowler, M.S., Assistant Professor of Drawing
R. A. Ragatz, M.S., Assistant Professor of Chemical Engineering
Herbert W. Wesle, B.S., Assistant Professor of Topographic Engineering
E. A. Abendroth, B.S., Instructor in Structural Engineering
George H. Abendroth, B.S., Instructor in Civil Engineering
George J. Heimerl, B.S., Instructor in Mechanics
W. H. Merry, B.S., Instructor in Metallurgy
Carl Oestreich, B.S., Instructor in Civil Engineering
H. W. Schmidt, B.S., M.E., Instructor in Mechanical Drawing
Sam Snead, Instructor in Radio Communication
George F. Spinti, A.I.A., Instructor in Architectural Design

Walter Veenendaal, A.I.A., Instructor in Architectural Drawing
C. A. Wiepking, C.E., Instructor in Structural Engineering
Ralph Williams, Instructor in Mechanical Drawing
Additional instructors to be appointed.

Letters and Science

Astronomy (See under Mathematics)

Biology

Donald C. Boughton, M.S., Assistant Professor of Zoology, Chairman
Benj. H. Schlomovitz, M.S., M.D., Lecturer in Physiology
Ruth I. Walker, Ph.D., Instructor in Zoology and Botany

Chemistry

George G. Town, Ph.D., Associate Professor of Chemistry, Chairman
Paul E. Millington, Ph.D., Assistant Professor of Chemistry
Chauncey C. Hale, M.S., Instructor in Chemistry
Edward N. Kramer, M.S., Instructor in Chemistry
Victor A. Reinders, M.A., Instructor in Chemistry
Alfred E. Rheineck, M.S., Instructor in Chemistry
Clair N. Sawyer, B.S., Instructor in Chemistry
Ruben W. Sy, Library Assistant

Economics

M. R. Schnaitter, M.A., Associate Professor of Economics, Chairman
George L. Leffler, Ph.D., Instructor in Economics

Education

Frank L. Clapp, Ph.D., Professor of Education
Theodore L. Torgerson, Ph.M., Lecturer in Education

English

Malcolm S. MacLean, Ph.D., Professor of English, Chairman
John J. Creamer, B.A., LL.B., Assistant Professor of English
Frank M. Hursley, M.A., Assistant Professor of English
Carl Taylor, M.A., Assistant Professor of Speech
Mary R. Babcock, M.A., Instructor in English
R. I. Blake, M.A., Instructor in English
Dudley C. Brooks, M.A., Instructor in English
Elisabeth K. Holmes, B.A., Instructor in English
Blenda M. Pearson, M.A., Instructor in English
R. M. Phillips, M.A., Instructor in Speech
Gracia E. Torinus, M.A., Instructor in English

Geography

Lucius T. Gould, B.A., Instructor in Geography

German

Charles M. Purin, Ph.D., Professor of German, Chairman
Paul F. Koehneke, B.A., Instructor in German
Paul H. Phillipson, Ph.D., Instructor in German
Bernard C. Straube, B.A., Instructor in German
Frieda A. Voigt, B.A., Instructor in German

History

Tracey E. Strevey, Ph.D., Assistant Professor of History, Acting Chairman
Hilmar C. Krueger, B.A., Instructor in History

Mathematics and Astronomy

George A. Parkinson, Ph.D., Associate Professor of Mathematics and Astronomy, Chairman

Morris Marden, Ph.D., Assistant Professor of Mathematics
William E. Roth, Ph.D., Assistant Professor of Mathematics
Florence L. Axen, M.A., Instructor in Mathematics
Leon Battig, M.A., Instructor in Mathematics
T. G. Brown, M.A., Instructor in Mathematics
Henry Ericson, B.A., B.S., Instructor in Mathematics
Eugene A. Rasor, M.A., Instructor in Mathematics
John I. Vass, M.A., Instructor in Mathematics
H. M. Zoerb, B.S., Instructor in Mathematics

Physics

Miles J. Martin, Ph.D., Associate Professor of Physics, Chairman
Lester T. Earls, M.A., Instructor in Physics
T. Alton Rouse, Ph.D., Instructor in Physics and Mathematics

Psychology

Instructor to be appointed.

Romance Languages

Charles E. Young, Ph.D., Professor of Romance Languages, Chairman
Meta M. Steinfort, M.A., Associate Professor of Spanish
Loreta Hagberg, M.A., Instructor in Spanish
Carol J. Sandy, M.A., Instructor in French
Florence C. Stehn, M.A., Instructor in French

Sociology

Philip Person, Ph.D., Assistant Professor of Sociology

LIBERAL EDUCATION

In addition to the full-time faculty listed above, some of whom are teaching courses in Liberal Education, the following distinguished lecturers have been invited to give courses in this field:

Mrs. Aileen Thiesen James, B.S., Instructor in Home Economics
Mrs. Vera Ellwood, Instructor in Home Economics
A. Eustace Haydon, Ph.D., Lecturer in Comparative Religion
A. R. Hohlfeld, Ph.D., Professor of German
B. Q. Morgan, Ph.D., Professor of German
Dudley Crafts Watson, Lecturer in Art

THE UNIVERSITY EXTENSION CENTER IN MILWAUKEE

Over 50 per cent of the people of Wisconsin live in the 20 eastern counties centering around the city of Milwaukee, which comprises only 17 per cent of the territory of the state. Over one-fifth of the people of the state live in Milwaukee county. The University Board of Regents, therefore, decided some twenty years ago that if the Extension Division were to serve effectively this heavily populated section, an extension center would have to be developed in the city of Milwaukee. Rented headquarters were first established in 1908. Through all the years the only program of service developed there has been extension classes. (Other state-wide services of the Extension Division as carried on from central headquarters at Madison are described on page 113.)

After the World War the federal and state governments requested the Extension Division to establish in Milwaukee a curriculum of freshman and sophomore courses in Letters and Science, Commerce, and Engineering for returned veterans whose tuition was to be paid by the government. This was done, and the courses became so popular that a number of Milwaukee parents requested the University to allow their sons and daughters, then graduating from high school and unable financially to come to Madison, to take these courses along with the veterans, and receive college credit. Permission was granted, and in 1923 the Board of Regents of the University offered these freshmen and sophomore extension courses to be made available to the graduate of any accredited high school in Wisconsin.

In 1921 the Legislature appointed an interim committee to make a special study of the Milwaukee extension situation, and of the need for a state-owned building. This committee made a printed report of its findings to the 1923 Legislature and recommended an appropriation of $150,000 for an Extension building in Milwaukee, which recommendation was enacted into law in 1925. The 1927 Legislature, after a full hearing by its joint finance committee, voted an additional $175,000 in order to build a building large enough to care for the actual needs. During the 1925 Legislature the State Attorney-General, when requested for a ruling, reported that the University Extension program in Milwaukee and the proposed building were legal and constitutional. From that day to this no policy has been altered that might in any way invalidate this ruling. While in the day classes there has been a normal growth in the number of students taking freshman and sophomore credit courses, in the evening classes the demand is more for the non-credit courses in liberal education and in those business and engineering subjects on a college level which fit one for progress in the industrial world. Only 18.8 per cent of the evening class registrations are for college credit.

One of the reasons why the classes in Milwaukee have been so popular is the fact that they are meeting the need of adults who must work hard for a living while trying to get an education. Milwaukee, being the largest city in Wisconsin, offers a great variety of opportunities for adults to find full or part time employment while taking these courses.

The adult who has already passed the school and college age, who must

work and earn his living and in many cases provide at the same time for a family, cannot carry a full residence program of studies. Colleges make out their schedules and curricula to meet the needs of full-time, relatively young students. The class program at the University Extension Division in Milwaukee, on the other hand, is organized to meet the special requirements of adults who are already in the practical work of life. The Extension Division offers courses in the morning, afternoon, late afternoon, and evening, so that an adult may attend classes at any period when he is not working. Since classes in the Extension building are held from eight o'clock in the morning until nine-thirty at night, or for thirteen and one-half hours a day, it is probably the most efficiently used college classroom building in the country.

The new building was completed during the summer of 1928. It comprises seven stories and contains twenty-five classrooms and lecture halls, six science laboratories (physics, chemistry (2), biology, engineering, and radio), and a spacious library and reading room.

The kind of institution which the University of Wisconsin Extension Division is developing in Milwaukee is one that can organize a program of study to meet the needs of the individual rather than one that forces the individual to follow a regular curriculum. Among those whose needs are given special attention are the following:

The student who must work and earn part or all of his expenses while taking courses.

The individual who wishes to have a special program of studies suggested by faculty advisers to fit his particular needs and abilities.

The adult who wishes to select his own courses without reference to credit toward a degree or the securing of a certificate.

The student who can afford to devote only two years to preparation for a position that requires college training.

The high school graduate who wishes to do his first two years of college work in an institution near home.

The adult who wishes to broaden his education along lines of his own choice for purposes of self-improvement, intelligent citizenship, and general culture.

GENERAL INFORMATION

LOCATION

Classes are held in the new University Extension building at 623 W. State Street, opposite the Milwaukee Vocational School and the City Auditorium. The twenty-five classrooms and lecture halls which this building affords, together with its library and six science laboratories, enable the Extension Division to offer a complete program of studies.

OPPORTUNITIES FOR WORK

Since this institution offers morning, afternoon, and evening classes, it is possible for students to arrange to take work for University credit at

General Office

convenient hours. Students expecting to earn their way through college are allowed to carry a reduced program of studies. Milwaukee, being the largest city in Wisconsin, offers a great variety of opportunities for high school graduates to come there from all parts of the State and find part time employment in many large industrial and business concerns.

GUIDANCE AND COUNSELLING

The University of Wisconsin Extension Center emphasizes individual attention to students. This work is carried on by the Guidance Bureau. Each

student is assigned a counsellor as soon as he enters. With his counsellor he can discuss his academic and personal problems as they arise, and work out a curriculum that best suits his needs. This is made possible by the varied types of work offered which include courses in Business, Engineering, Letters and Science, Liberal Education, and special courses in the Technical Institute.

REGISTRATION

Registration consists of filling out the necessary blanks provided at the office and **paying in full** for the courses taken. **No one is placed on the class roll** until he has complied with this rule.

For dates of registration see calendar on inside of front cover. The office is open from 8:30 a. m. to 5 p. m. and from 7:00 to 9:30 p. m. on all the week days except Saturday, and from 8:30 to 12 noon on Saturday. From September 14 to October 3 and from February 2 to February 20 inclusive the office will be open continuously from 8:30 a. m. to 8:30 p. m. on all week days except Saturday and it will be open on Saturday from 8:30 a. m. to 3:00 p. m.

FEES

A fee of five dollars ($5.00) a credit hour is charged for all university extension work. Laboratory fees and textbooks are additional. All fees are payable at the time of registration. A fine of three dollars ($3.00) is charged for late registration in the day classes and one dollar ($1.00) for late registration in the evening classes.

ATTENDANCE

Evening Classes

Students desiring University credit are not allowed more than two absences per semester in any two-credit course. Those having absences in excess of that number shall satisfy the instructor that the work has been made up by special examination or otherwise before credit is given. In certificate courses four absences are allowed. Absences in excess of this number are to be made up in a manner similar to the procedure as outlined in the credit courses above.

All students who receive credit toward a certificate or a degree must take the final examination and make a minimum grade of 70 per cent for the course.

Day Classes

Any student who at the date of the mid-semester examination in any course has been absent from more than five per cent of the total number of meetings to be held during that semester and who fails to pass said mid-semester examination may be required to drop the course with failure. Any student whose percentage of absence for any semester in any course exceeds ten per cent of the total number of meetings scheduled for that course may be excluded from the final examination and given a condition.

Absence from a recitation immediately preceding or following Thanksgiving Day or the Christmas or Spring Recess shall count as two ordinary absences.

Absence from a quiz section carries a grade of zero for the period covered by that quiz section unless the work is made up to the satisfaction of the instructor concerned.

CHANGE OF STUDIES AND DROPPING STUDIES

Day Classes

A student who wishes to make a change in his schedule of studies must secure the written approval of his counsellor and of his instructor.

A student who drops a subject without the written permission of the Scholarship Committee, secured in advance (through the counsellor), will receive a failure in that study and may be subject to further discipline by the faculty.

REFUNDS

Evening Classes

All applications for refunds must be made in writing.

Applications for cash refunds must be made before the end of the third week of instruction. A registration fee of $2.00 is retained on all refunds.

No cash refunds are given after the end of the third week of instruction.

Students who apply for refunds from the fourth to the sixth week inclusive will receive a credit memorandum card covering a fraction of the fee paid. This card is not transferable but may be applied on a future enrollment by the student to whom it is issued.

No refunds of any kind are made after the first six weeks of instruction.

Day Classes

Partial refunds to students withdrawing from the day classes are made upon the following basis if written notice is given at the time of withdrawal: within two weeks from the first day of instruction, 80% refund; within four weeks, 60%; within six weeks, 40%; within eight weeks, 20%; after eight weeks, no refund.

STUDENT ACTIVITIES

Essayons Club. The Essayons Club is an organization of the girls of this school. It has a two-fold purpose: to promote athletics and social activities among the girls. Every week the club has general discussions on topics selected by the girls themselves. These gatherings are supervised by a faculty adviser. Athletics include swimming, bowling, hiking, basketball, and tennis according to the season and the girl's individual inclinations. Officers are elected semi-annually during the last month of the semester.

Mathematics Club. The Mathematics Club is an organization of the students who are interested in mathematics. The club holds monthly meetings at which papers are presented by students and members of the faculty. A portion of each meeting is spent in playing mathematical games and in the solution of mathematical puzzles. The purpose of the club is to stimulate the interest of students in mathematics by discussing many interesting phases of the subject which cannot be taken up in the classroom, and by showing the fundamental relation of mathematics to the other sciences.

Women's Rest Room

German Club. The German Club aims to acquaint its student members with Germany and its people and with the achievements of Germany in the fields of art, science, and literature. In addition it furnishes supplementary practice in language work. The club meets twice a month and is open to all students interested in the German language. Musical numbers, presentation of plays, recitations, short talks on cultural subjects, and singing of popular folk-songs make up the programs. Other meetings held during the year are of a purely social character intended to promote good fellowship. Some of the meetings will be open to the public.

Spanish Club. All students now studying Spanish as well as others who have studied Spanish in the past are eligible to membership. The members plan to hold monthly meetings with carefully prepared programs. Each program consists of two distinct parts: first, a formal program of special numbers such as talks, reports, music, dancing, dialogues or plays; second, a social program with informal group songs, games, and contests.

Spotlight Club. Students desiring experience in acting, producing, costuming, or writing plays are welcome in the Spotlight Club. A short dramatic program is given at each of the monthly meetings, and two public programs are given each year.

Intercollegiate Debates. Tryouts are held early in the fall to choose a debate squad. During the year debates are held with the University of Wisconsin and other schools. Any student carrying a normal credit load is eligible for these tryouts.

Physical Education. The requirement in Physical Education, for both men and women students, is three hours a week. This requirement can be met by taking either regular gymnasium work or by combining gym work with other forms of athletics.

All student activities, such as student dances, Spotlight plays, etc., must terminate by May 15.

THE LIBRARY

The library was organized in 1928. Starting with a collection of approximately 1,000 books, which comprised the library in the old Extension building, the library is now a collection of 4,500 volumes. More than 60 periodicals are currently received by the library.

Recently the library has been the recipient of a very fine collection of 500 books and 400 pamphlets on socialism, most of them in the German language, as well as a complete file of topographical and geological maps of the states, presented by Mrs. Victor L. Berger from the private library of her husband, Victor L. Berger. This collection will be known as the Victor L. Berger collection.

The library is housed in Rooms 210-211 on the second floor of the University Extension Building. During the school year the library is open daily from 8:30 a. m. to 9:30 p. m. and on Saturday morning from 8:30 to 12:00, with shorter hours during vacations. Books may be drawn for home use for a two-week period, excepting those "reserved" by the faculty for supplementary reading and books of general reference.

For research work by the faculty the library is allowed to borrow from the University of Wisconsin library through the inter-library loan system.

SCHOLARSHIP AWARDS

The Gamma Kappa Phi Fraternity awards a cup on which is engraved the name of the student who is voted each year by the faculty as having achieved a superior record in general scholarship and having shown school loyalty and fraternal spirit. In addition, a scholarship emblem is presented to the winner. Students competing for this honor must have taken at least three semesters' work at this institution.

A similar cup is awarded, through the courtesy of Mr. George Brumder, by the Milwaukee Herold for superior work in German. The candidates competing for this award must have studied German at the Extension Division for at least two semesters and must have obtained not less than 28 credits in that year, with a minimum average of 80.

Sophomore Honors are awarded by the faculty at the close of the year to those students who have made a record similar to that required for obtaining the same honor at the University of Wisconsin. Sophomore High Honors are also awarded.

A special award is granted each year to the sophomore who has the highest number of grade points per credit for two full years' work at the Extension Division.

Freshman Honors are awarded each year to three students having the highest number of grade points per credit for that year. The standing of the various students shall be computed upon the basis of their first semester grade and the mid-semester grade of the second semester. A student eligible for this award shall have carried a full schedule of work, that is to say, shall have completed 30 credits of work by the end of the semester in which the award is made.

THE HENRY HARNISCHFEGER AWARD

Beginning with the academic year 1929-30, and extending over a period of five consecutive years, an annual prize of fifty dollars is provided by the late Mr. Henry Harnischfeger of Milwaukee for the best German essays. Candidates must have studied German in the high schools of Milwaukee (suburbs included) for at least four semesters. The prizes will be awarded by a jury, consisting of three members, to the students writing the best German essays on an assigned topic. The date of the essay contest, which will be held at the University Extension Center, 623 West State Street, will be communicated to the high school principals and their German staffs two weeks in advance.

H. H. WEST COMPANY AWARD

The H. H. West Company of Milwaukee offers a slide rule each year as a prize to the student in the Two-Year Course in Building Design and Construction whose work has been the most satisfactory.

LECTURE BUREAU

The University Extension Center in Milwaukee strives to make its services readily available to societies, organizations, study groups, and the public. It maintains a special bureau through which arrangements may be made for lectures by members of its faculty. These lectures include discussions and demonstrations in the fields of astronomy, business, chemistry, child guidance, linguistics, literature, mathematics, physics, radio, travel, zoology, and other branches of knowledge.

Persons searching for suitable speakers for clubs, assemblies, business or technical gatherings, study groups, should get in touch with the Bureau. The fee for the lecture may be arranged with the Bureau. A bulletin describing some of the lectures and scientific demonstrations may be obtained by telephoning Marquette 7051, or by writing the Lecture Bureau, University Extension Division, 623 West State Street, Milwaukee, Wisconsin.

UNIVERSITY CREDIT COURSES

ADMISSION

Entrance requirements are stated in units of high school work, a term which is not to be confused with the term credit as applied to university work. A unit represents five class periods a week in one branch of study for a school year of at least 36 weeks. Two laboratory periods in any science or vocational study are considered equivalent to one class period. In closely allied subjects, such as botany and zoology, not usually taught throughout an entire year, units may be constructed by adding the respective time values of the subjects. Three periods a week for a year and a half may be counted as one unit.

No one may receive credit unless he has satisfied the entrance requirements of the University and has had the necessary prerequisites for the desired courses. **The responsibility for complying with these rules rests with the student; the Extension Division will not guarantee credit unless the student has filed in advance records of all credits from other schools including high schools.** Adult students who do not have the necessary entrance credits and prerequisites may be admitted to these credit courses, but they will not receive University credit.

Throughout this bulletin all courses marked with an asterisk (*) involve credit toward a University degree for properly qualified students.

GENERAL REQUIREMENTS

Graduation from high school with fifteen units, distributed as follows, is the fundamental requirement for regular admission to any college or course in the University:

I. Two units of English are required of all entrants; three units are recommended for all and are required of those who do not offer two units of a foreign language.

II. One unit of algebra and one of geometry are also required of all, with an additional half or whole unit of algebra recommended for those seeking admission to the College of Engineering.

III. Two units of science or history, or two units of one of the following foreign languages—French, German, Greek, Hebrew, Italian, Latin, Norse, or Spanish—must be presented by all. If foreign language is offered, there must be at least two units in a single language, although in exceptional cases one unit may be offered as the optional subject.

IV. The remaining units necessary to bring the total to fifteen must be offered from Groups A and B, with a maximum of four units from Group B and a total of not more than four units in any single subject.

GROUP A

	Units
English	1-2
Foreign Language	
French	1-4
German	1-4
Greek	1-3
Hebrew	1-2
Italian	1-2
Latin	1-4
Norse	1-2
Spanish	1-4
History and Civics	
History	1-4
Civics	½ -1
Economics	½
Mathematics	
Advanced Algebra	½ -1
Solid Geometry	½
Trigonometry	½
Science	
Botany	½ -1
Biology	1
Chemistry	1
General Science	½ -1
Geography	½ -1
Physics	1
Physiology	½
Zoology	½ -1

GROUP B (not to exceed a total of four units)

	Units
Agriculture	1-4
Bookkeeping	½ -2
Typewriting (if not combined with short hand only ½ unit will be allowed)	½ -1
Shorthand	2
Commercial law	½
Commercial arithmetic	½
Commercial geography	½
[1]Business organization	½
[1]Salesmanship	½
[1]Office practice	½
Domestic science	1-2
Domestic art	1-2
Drawing, art, and design	1-4
Mechanical drawing	1-4
Shop work	1-2
Shop work and drawing	1-4
Music	1-4
History and appreciation	1
Theory and harmony*	2
Choral music	½ -1
Orchestra	½ -2
Band	½ -2
Applied music	½ -2
Optional (excluding drill subjects)	½ -1

([1]To be accepted for entrance only when offered during the junior or senior year.)
(*Not less than 2 units accepted.)

UNDERGRADUATE CREDIT

The total number of credits that may be earned in the Extension Division combining instruction in day classes, evening classes, and correspondence cannot total more than the equivalent of two years' credit in any curriculum.

Graduates of two-year normal schools or of junior colleges, or those who have finished two years of work at a four-year college are permitted to elect suitable courses of junior rank if they are offered at the Milwaukee Center. Such students may elect freshman or sophomore work if the requirements for the degree they seek include such work. The nature of this work will be determined by a committee of the faculty of the Milwaukee Center, and the amount is not to exceed two year-courses.

All candidates for degrees must expect to take their senior year in residence. The minimum residence requirement is 30 credits and 30 grade-points, to be earned in at least two semesters at Madison (or six summer sessions, in no one of which may less than four credits be carried). All the requirements of the major subject must be met, including at least 15 credits and 15 grade-points in advanced work (in some departments 20) in residence. If application is made in advance, very exceptional cases may be given special consid-

eration by the dean or the executive committee of the College of Letters and Science.

Graduates of the two year professional courses of the state normal schools and teachers' colleges who are candidates for the degree of bachelor of philosophy for normal school graduates are reminded that the course will be discontinued in August, 1932.

Credits and Grade Points

Throughout this bulletin the courses marked with an asterisk (*) involve credit toward a university degree for properly qualified students. In order to receive a degree the student must have not only the number of credits required in the course which he is pursuing, but his studies must reach a certain average of excellence. This standard is fixed by the grade-point system, which requires for graduation from any course as many points as credits. The following table shows the University scale of grading, together with the number of points per credit for each grade:

Percentage	Grade	Points per Credit
93-100	Excellent (A)	3
85- 92	Good (B)	2
77- 84	Fair (C)	1
70- 76	Poor (D)	0
60- 69	Condition	0
Below 60	Failure	0

A student in the general courses in Letters and Science who has received a grade of **B** in each subject of the preceding semester may take not to exceed 18 credits.

NEW REQUIREMENTS IN THE COLLEGE OF LETTERS AND SCIENCE AS ADOPTED BY THE FACULTY

Entering freshmen will be given placement examinations in English, Foreign Languages, and Mathematics (where the students expect to continue Mathematics in college); and may take the attainment examination in English, Foreign Languages, History, Mathematics, and (or) the Sciences. A student who passes the attainment examination of a university course will not receive therefor credit toward graduation; but will receive credit toward subject requirements, and thus obtain a greater freedom of election.

For language requirements for the B.A. degree, see page 86.

Students who have secured a total of 60 credits and 60 grade points, and who have pursued for two years approved programs which would normally lead to the degree of B.A., B.S., or Ph.B., will be given certificates entitling them to the rank of Junior Graduate in Liberal Studies.

Such students who at the same time meet the specific requirements of any vocational course credited by the College of Letters and Science will have said fact noted on their certificates.

At the close of the sophomore year, students will be classified, according to their university records, into: Class 1, consisting of those students whose grade point average is 1.3 or higher; Class 2, consisting of those students whose grade point average is 1.2; Class 3, consisting of those students whose grade point average is 1.1 or lower.

The following regulations govern admission to the junior year:

1. Admission to the junior year will be automatic for students belonging to Class 1.
2. Students belonging to Class 2 may apply for admission to the junior year. Their applications may be supported by written recommendations from members of the teaching staff under whom the student has worked during his sophomore year.
3. Students belonging to Class 3 will in general be excluded from admission to the junior year at Madison; but those with improving records may be recommended for admission.

Students who, at the end of their fourth semester, have not completed the requirements for the certificate of junior graduation in Letters and Science may be permitted to return, on probation, for one semester to complete this work. Such students will be permitted to enter the junior year only by action of the special committee of the College of Letters and Science.

GRADUATE CREDIT

Master's Degree. Residence requirements for the Master's degree are as follows: A minimum of six summer sessions of six weeks each or four summer sessions of nine weeks each in residence at the University of Wisconsin. In lieu of a half or less required residence (See Bulletin of the Graduate School) candidates may pursue certain approved extension courses given by members of the University of Wisconsin graduate faculty. **This privilege is open only to students who have established residence in the Graduate School at the University of Wisconsin and have made arrangements in advance with the Dean of the Graduate School. The Extension Division will accept registrations from students with degrees only on the basis of additional undergraduate credit.**

The fee for **in absentia** is $20, payable $10 at the time of registration, and $10 when the oral examination is given.

UNIVERSITY COURSES OF THE FRESHMAN AND SOPHOMORE YEARS

The University Extension Division offers freshman and sophomore programs of study in the following courses:

Letters and Science	Pre-Commerce
Engineering	Pre-medical
Chemistry	Pre-legal
Chemistry-Commerce	Pre-journalism

All of these courses have been approved by the respective residence departments at Madison and will carry full credit toward a university degree.

OUTLINES OF FRESHMAN LETTERS AND SCIENCE CURRICULA

1. Letters and Science (B.A. degree)

		Credits per semester
English 1a-1b		3
Foreign language		4-3
Mathematics	Two of these are required, at least one to be taken in the freshman year.	4
Science		5
History		3
Physical Education		—
		14-16

Two foreign languages may be elected if desired. Mechanical drawing (3 credits) may be elected if the student wishes to take only one study from the mathematics-science-history group in the freshman year.

2. General Course (Course without foreign language requirement, leading to the Ph.B. degree)

		Credits per semester
English 1a-1b		3
Science	One or both of these or two sciences	5
Mathematics		4
Mathematics	Two of these are required, at least one to be taken in the freshman year.	4
History		3
Foreign lang.		4
Physical Education		—
		14-16

Mechanical drawing (3 credits) may be elected in place of one subject in either of the groups specified above, provided the student takes the second subject in his sophomore year.

3. Chemistry Course (B.S. degree)

	Credits per semester
English 1a-1b	3
Chemistry 1a-1b	5
German or French	4
Mathematics 1-2	4
Physical Education	—
	16

4. Chemistry-Commerce Course (B.S. degree)

	Credits per semester
English 1a-1b	3
Mathematics 1*-7	4
Foreign language	4
Chemistry 1a-1b	5
Physical Education	—
	16

*If the student has taken advanced algebra in high school, he may omit Mathematics 1.

5. (a) Pre-commerce Course (leading to B.A. degree)

	Credits per semester
English 1a-1b	3
Foreign language	4
Mathematics 1-7	4
Science 5 credits or History 3 or 5 credits	3-5
Physical Education	—
	14-16

(b) Pre-commerce Course (non-language, leading to Ph.B. degree)

	Credits per semester
English 1a-1b	3
Mathematics 1, 2 or 3—7*	4-3
Science	5 or 10
(History)	(3)
Physical Education	—
	14-16

*Mathematics 7, second semester.

6. (a) Three-year Premedical Course (leading to B.A. degree)

	Credits per semester
English 1a-1b	3
Chemistry 1a-1b	5
French 1a-1b or German 1a-1b	4
History 3 credits or Mathematics 4 credits	3-4
Physical Education	—
	15-16

(b) Two-year Premedical Course (leading to B.S. degree)

	Credits per semester
English 1a-1b	3
Chemistry 1a-1b	5
Physics 1	5
French 1a or German 1a	4
(Latin 1-2*	5)
Physical Education	—
	17

*Required only if student has not had two years of high school Latin.

7. Pre-legal Course

Same as either Curriculum 1 or 2 above.

8. Pre-Journalism Course

Journalism 1a-1b	1
English 1a-1b	3
Foreign language (one or two)	3-8
History 1a-1b, 5a-5b, or 10a-10b	3
Science	5
Physical Education	—
	15-16

OUTLINES OF ENGINEERING CURRICULA

Leading to the Degree of Bachelor of Science

Civil Engineering

Freshman

First Semester

	Credits
Math. 51—Elementary analysis	5
Draw. 1—Elements of drawing	3
Chem. 2a—General chemistry	4
Engl. 1a—Freshman English	3
Top. Engr. 1—Elementary surveying	2
Physical education	0
	17

Second Semester

	Credits
Math. 52—Elementary analysis	5
Draw. 2—Elements of drawing	3
Chem. 2b—General chemistry	4
Engl. 1b—Freshman English	3
Top. Engr. 2—Elementary surveying	2
Physical education	0
	17

Sophomore

First Semester

	Credits
Math. 54—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5
Draw. 3—Descriptive geometry	3
Top. Engr. 3—Land surveying	3
Ry. Engr. 1—Railway curves	2
Physical education	0
	17

Second Semester

	Credits
Math. 55—Differential and integral calculus	4
Physics 52—Lectures and lab. practice	5
Mechanics 1, 2—Statics, dynamics	5
Top. Engr. 104—Advanced surveying and mapping	3
Physical education	0
	17

Mechanical Engineering

Freshman

First Semester

	Credits
Math. 51—Elementary analysis	5
Engl. 1a—Freshman English	3
Draw. 1—Elements of drawing	3
Shop. 1—Elementary pattern making	1
Shop. 2—Bench work, forge, and welding	1
Chem. 2a—General chemistry	4
Physical education	0
	17

Second Semester

	Credits
Math. 52—Elementary analysis	5
Engl. 1b—Freshman English	3
Draw. 2—Elements of drawing	3
Shop. 4, 5—Lathe work in metals, shaper, planing, and milling	2
Chem. 2b—General chemistry	4
Physical education	0
	17

Sophomore

First Semester	Credits	Second Semester	Credits
Math. 54—Differential and integral calculus	4	Math. 55—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5	Physics 52—Lectures and lab. practice	5
Mach. Des. 1—Mechanism	4	Mach. Des. 2—Design practice	1
Draw. 3—Descriptive geometry	3	Mechanics 1, 2—Statics, dynamics	5
Shop. 6—Tool making	2	Speech 8—Extempore speaking	2
Physical education	0	Physical education	0
	18		17

Electrical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Shop. 1—Elementary pattern making	1	Speech 8—Extempore speaking	2
Shop. 2—Bench work, forge, and welding	1	Chem. 2b—General chemistry	4
Chem. 2a—General chemistry	4	Physical education	0
Physical education	0		
	17		17

Sophomore

First Semester	Credits	Second Semester	Credits
Math. 54—Differential and integral calculus	4	Math. 55—Differential and integral calculus	4
Physics 53—Lectures and lab. practice	3	Physics 54—Lectures and lab. practice	3
Draw. 3—Descriptive geometry	3	Mechanics 1, 2—Statics, dynamics	5
Econ. 1a—Elements of economics	4	Top. Engr. 108 (elective)	3
Machine Des. 1—Mechanism (elective)	4	Econ. 1b—Elements of economics (elective)	4
Physical education	0	Physical education	0
	18		19

Students who wish to complete the electrical engineering course in four years are advised to transfer to the College of Engineering at Madison at the end of the third semester. Otherwise it will be necessary to attend one summer session in order to complete the required work within the four year period.

Chemical Engineering

Freshman

First Semester **Second Semester**

Same as for Mechanical Engineering

Mining Engineering, Metallurgical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Shop 1—Elementary pattern making	1	Top. Engr. 108—Short course in surveying	3
Shop. 2—Bench work, forge, and welding	1	or	
Chem. 2a—General chemistry	4	Shop 4, 5—Lathe work, planing, milling	2
Physical education	0	Chem. 2b—General chemistry	4
		Physical education	0
	17		17-18

Students who wish to complete the chemical engineering, mining engineering, or metallurgical engineering courses in four years are advised to transfer to the College of Engineering at Madison at the beginning of the sophomore year.

EVENING CERTIFICATE COURSES

BUSINESS

The completion of a well-rounded program of study is of much greater benefit to the student of Business than taking separate courses at random. Realizing this, the University of Wisconsin, through the Extension Division, will give a special certificate to young men and women who satisfactorily complete a series of related courses in any one of six special fields. The certificate may be earned in Accounting, in Marketing and Advertising, in Finance and Credit, in Industrial Management, in General Business, or in Secretarial Work. For certificate courses in Real Estate see page 29.

In order to secure a certificate, a student must have completed satisfactorily twenty-four semester hours (ordinarily twelve courses) in one of the six special fields in which certificates are granted, including all the required courses and certain elective courses. The special requirements for each group are listed below.

To complete the requirements for a certificate, it will be necessary, ordinarily, for the student to attend classes two evenings a week for three years. Students who are interested in taking a program of courses in preparation for the certificate should consult a member of the business faculty.

The following schedules of subjects show which courses are required and which courses may be elected in each of the six certificate groups. In addition to the required courses the student must elect, with the approval of his faculty adviser, enough courses to bring his total up to twenty-four semester hours. Each required course is indicated by a dagger (†).

Certificate Course in General Business

†Business Principles or Business Management
Business English or English 1a
English 1b
†Business Correspondence
†Accounting 1M
†Accounting 2M
Accounting 3M
Accounting 4M
Economics 1a
Economics 1b
Business Economics 355M
Corporation Management
†Business Law 101M
Business Law 102M
Business Law 103M
Business Law 104M
Business Psychology
†Factory Management
Labor Problems
Labor Management
†Marketing Methods
Advertising Procedure
Salesmanship
Public Speaking
Money and Banking
†Business Finance
Fundamentals of Real Estate Practice
Real Estate Financing

Certificate Course in Accounting

†Business Principles or Business Management
†Accounting 1M
†Accounting 2M
Business English or English 1a
English 1b
†Business Correspondence
†Accounting 3M
†Accounting 4M
†Auditing 5aM
†Auditing 5bM
†Cost Accounting 9aM
Cost Accounting 9bM
C. P. A. Problems
Federal Income Tax
Economics 1a
Economics 1b
†Business Law 101M
†Business Law 102M
Business Law 103M
Business Law 104M
Money and Banking
Business Finance
Analysis of Financial Statements
Advanced Accounting Problems

One who intends to enter public accounting work will need to take more than the twenty-four semester hours which are necessary for this certificate. His faculty adviser will gladly make suggestions for further study.

Certificate Course in Marketing and Advertising

†Business Principles or Business Management
Business English or English 1a
English 1b
†Business Correspondence
†Marketing Methods
General Psychology
†Business Psychology
Economics 1a
Economics 1b
†Advertising Procedure
†Advertising Campaigns
Retail Advertising
Money and Banking
Business Finance
Credits and Collections
Business Law 101M
Business Law 102M
Business Law 103M
Business Law 104M
†Salesmanship
Sales Management
Public Speaking
Retail Store Management

Certificate Course in Finance and Credit

†Business Principles or Business Management
†Accounting 1M
†Accounting 2M
Economics 1a
Economics 1b
Business English or English 1a
English 1b
†Business Correspondence
††Credits and Collections
Money and Banking
†Business Finance
†Analysis of Financial Statements
§Business Law 101M
§Business Law 102M
Business Law 103M
Business Law 104M
Corporation Management
§Practical Banking
†Investments
Real Estate Financing
§Bank Administration
††Legal Aspects of Credits and Collections

††Required of each student whose major interest is Credits and Collections.
§Required of each student whose major interest is Banking.

Certificate Course in Industrial Management

†Business Principles or Business Management
†Accounting 1M
†Accounting 2M
†Cost Accounting 9aM
†Cost Accounting 9bM
Business English or English 1a
English 1b
†Business Correspondence
Economics 1a
Economics 1b
General Psychology
Business Psychology
†Labor Problems
†Labor Management
Business Law 101M
Business Law 102M
Business Law 103M
Business Law 104M
†Factory Management
Public Speaking
Corporation Management

Certificate Course in Secretarial Work

†Business Principles
†Business English or English 1a
English 1b
†Business Correspondence
General Psychology
Business Psychology
Accounting 1M
Accounting 2M
†Secretarial Training Course 714M
†Secretarial Training Course 715M
Economics 1a
Economics 1b
Business Law 101M
Business Law 102M
Public Speaking
Marketing Methods
Advertising Procedure
Salesmanship
Practical Banking
Corporation Management
††Electives

††Those students who know definitely in what fields they are preparing to do secretarial work should go beyond the subjects listed on this page and choose electives from business courses in the field selected such as Advertising, Accounting, Finance, or Real Estate. This program is also intended to meet the cultural needs of the students who enroll in it. Students may, therefore, choose electives in such fields as English literature, Modern Language, History, Psychology, and Social Sciences.

CERTIFICATE COURSES IN REAL ESTATE

To students who satisfactorily complete eight of the Real Estate courses listed below will be issued a University Extension Division certificate endorsed by the National Association of Real Estate Boards. The Milwaukee Real Estate Board will issue an official certificate to anyone who is certified by the University Extension Division as having satisfactorily completed four of the Real Estate courses in this list.

Real Estate Courses	Other Courses Recommended
Fundamentals of Real Estate Practice	Salesmanship
Real Estate Law	Public Speaking
Real Estate Transfers and Conveyancing	Business English
Real Estate Financing	Business Correspondence
Problems of Land Utilization	Business Psychology
Selling of Real Estate	Business Finance
Real Estate Appraisals	Investments
Property Management and Real Estate Office Management	Advertising Procedure
City Planning and Zoning	

ENGINEERING

AERONAUTICS

A special certificate in Aeronautics may be obtained by successfully completing the following group of courses covering four semesters' work of two evening classes a week.

The various subjects in the group on Aeronautics are designed to give a well rounded knowledge of the technical problems involved in aviation, although pilots, mechanics, airport workers, and office workers may take certain subjects to fit their immediate needs. The primary purpose in offering this certificate group is to give students an opportunity to gain a broader view of aviation by taking the complete list of subjects. They thus become better fitted for their present work or qualified to advance to positions of greater responsibility in the aeronautics industry.

The material treated in the courses will be up to date in every respect. A special effort will be made to keep it as practical and useful to the student as possible.

Prerequisite: High school education or courses in algebra, physics, and drawing.

First Year

First Semester	Second Semester
Elementary Aeronautics, Aero 1	Airplane Engine Theory and Details, Aero 3
Aircraft Construction, Aero 2	Airplane Engine Maintenance, Aero 4

Second Year

First Semester	Second Semester
Aviation Law and Insurance, Aero 5	Special Problems in Aero Engineering, Aero 8
Cost Accounting in Aviation, Aero 6	Drafting in Aero Engineering, Aero 9
or	
Meteorology and Air Navigation, Aero 7	

COURSES FOR BUILDERS

Structural Design, the first group of subjects outlined below and offered in evening classes, is intended for men who are working in offices or drafting rooms on structural work, or for men who are interested in structural work. Building Design, the second group outlined, is intended for men who are working or plan to work in architects' offices, and for those who are interested in architectural work. Both courses will be of much benefit either to men who plan to enter contracting work in the employ of some contractor

or to men who intend to go into business for themselves. A University Extension Certificate is given for the successful completion of either group of courses consisting of six semesters' work of two nights a week, or the equivalent.

The demand for competent workers in the fields of design and building is constantly growing, and the responsibilities of men in charge are great. Financial estimates must be accurate; architectural designs must be pleasing in appearance and in ornamental details. Evening study under competent teachers offers the only practical way for the average man to keep pace with modern progress in this field. He will still need the architect and the structural engineer for the large and more important projects, but the training in these courses will fit him to hold more responsible positions, to bid more intelligently and accurately, and to plan architectural details and supervise small projects more competently.

STRUCTURAL DESIGN

First Year

First Semester	Second Semester
Estimating for Builders 497 aM	Estimating for Builders 497bM
Structural Theory 450 aM	Structural Theory 450bM

Second Year

[1]Steel Design and Details 422aM	[1]Steel Design and Details 422bM

Third Year

[1]Reinforced Concrete 417aM	[1]Reinforced Concrete 417bM

[1]Two evenings a week.

BUILDING DESIGN

First Year

First Semester	Second Semester
Architectural Drawing 243aM	Architectural Drawing 243bM
Estimating for Builders 497aM	Estimating for Builders 497bM

Second Year

Architectural Design 1aM	Architectural Design 1bM
Structural Theory 450aM	Structural Theory 450bM

Third Year

Steel Design and Details 422aM	Steel Design and Details 422bM
Elective	Elective

Electives

Concrete Work 474M
Structural Steel Drafting 413M
Law of Contracts 101M

Any two of these subjects may be taken as electives.

Note: Algebra and Trigonometry are required for Structural Theory. Structural Theory must be completed before Steel Design and Details is taken up.

HEATING, VENTILATION, AND REFRIGERATION

This two-year course is offered for builders, draftsmen, engineers, contractors, estimators, building inspectors, and others who will be benefited by a practical course which will help them to plan, install, estimate, and inspect the various types of mechanical equipment which enter into the construction of our modern buildings. The aim throughout the course will be to make the work extremely practical.

The course will provide a good foundation training for those with little or no previous experience or instruction in the subjects outlined; it should also prove valuable to those who wish a review of the fundamental principles involved in the various subjects.

A certificate is given by the University Extension Division upon the satisfactory completion of the course.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics, especially arithmetic, is required for entrance.

First Year

First Semester	Second Semester
Elementary Algebra and Trigonometry 13aM	Freehand Industrial Sketching, 203M. Sp.
Estimating for Builders 497aM	Estimating for Builders 497bM

Second Year

Heating and Ventilating 223aM	Heating and Ventilating 223bM
Refrigeration 222M	Mechanical Equipment of Buildings 224M

MACHINE DESIGN

Students in evening classes may qualify for the Special Certificate of the Extension Division in Machine Design by successfully completing six semesters' work of two nights a week, or the equivalent.

The student who intends to become a machine designer should have as basic training some experience in shop practice. This he must secure in some shop where he will learn the uses and limitations of lathes, planers, and milling machines. At the same time he can qualify as a tracer by taking the evening class work in mechanical drawing. This will enable him to secure the necessary skill to advance into the drafting room. He must follow this up with a study of mechanical movements and of mechanical principles. The properties and strength of cast iron, steel, brass, and other material should be thoroughly understood; these subjects are covered during the second year.

The work of the third year treats of the strength and proportioning of parts to withstand the stresses to which they will be subjected in the finished machine.

Prerequisites are one year of algebra and elementary trigonometry. The evening course in algebra and trigonometry is recommended the first year and will be counted as an elective.

First Year

First Semester	Second Semester
Mechanical Drawing 1	Mechanical Drawing 2

Second Year

Mechanism 208M	Strength of Materials 207M
Elementary Mechanics 206aM	Elementary Mechanics 206bM

Third Year

Machine Design 209aM	Machine Design 209bM

Elective—Two evenings per week for one semester, or one evening per week for two semesters. Mathematics is recommended.

With the permission of the head of the Engineering Department, experienced draftsmen may substitute other Mechanical Engineering subjects for Drawing 1 and 2. Among the subjects that may be so elected when offered are: Freehand Industrial Sketching; Vibration Problems in Engineering; Heating and Ventilating; Internal Combustion Engines.

LIBERAL EDUCATION

The University of Wisconsin Extension Division in Milwaukee has expanded the facilities for adult education by offering, without paralleling the usual college subjects, a series of courses aiming to give the foundation of a liberal education. The courses are on a college or university plane, but no credit towards a degree is involved. The program is in line with the most recent experiments in this type of education in Europe and America.

The underlying principles and aims of the series of Liberal Education courses may be summed up as follows: To give an opportunity for adults to acquire an education which involves more than the obtaining of information and skill—an education which will lead to emancipation from a "drifting with the group" opinion; an education which will engender capacity for self-criticism; and above all, an education which will create a feeling for those things that make life richer and more significant.

With regard to the method of conducting classes, two types of courses are offered: First, lecture courses accompanied by discussions; and, second, courses organized on the basis of co-operative group activities in which the instructor functions as guide and adviser. In certain discussion courses the enrollment is limited.

The requirement for a certificate in Liberal Education is ten semester courses. Unless special permission is granted to the contrary, students must choose at least one course from each of the six groups in "Series A." (See page 36). The remaining four courses may be selected from "Series A," "Series B," the University credit courses, the Business certificate courses, or the Engineering certificate courses. Credit towards a certificate will be given to students who have attended the courses with reasonable regularity. Anyone wishing to take the semester examination may do so for his own satisfaction; in such cases the instructor should receive advance notice. If students present credit for work done at other colleges or universities, such credit may be applied in part fulfilment of the requirement for a certificate.

Ability to carry a course and to profit by it is the only requirement for admission.

CURRICULUM IN

Liberal Education Certificate Courses		University Credit Courses
	SERIES A*	
Philosophy Group I	Philosophers from Plato to the Present Day	English Composition
	Modern Ethics	Short Story Writing
	Thinking	
Social Science Group II	Social Problems	English Literature
	Our Economic Organization	
	Problems in Government	American Literature
	International Relations	
	Introductory Psychology	Psychology
History Group III	Ancient Civilizations	
	Medieval Civilizations	Education
	Contemporary Civilizations	
	European Influences upon American Life and Institutions	Economics
	The Cultural Background of Milwaukee and Wisconsin	Sociology
	History of Religions	Geography
Language-Literature Group IV	The Story of Language	
	The Bible as Literature	Physics
	Masterpieces of Foreign Literatures in English Translations	Chemistry
	English Poetry from the Beginning of the Nineteenth Century	Biology
	Shakespeare and His Contemporaries	
	Modern American and English Novelists	History
Art Group V	Appreciation of Painting and Sculpture	Mathematics
	Appreciation of Music	Latin
	Appreciation of Drama	
Biological and Physical Sciences Group VI	Fundamentals of the Biological and Physical Sciences	French
	General Biology	German
	Contributions of Contemporary Scientists of the World	Spanish
	Geology and Geography of Wisconsin	
	Series B*	
	Psychology of the Pre-School Child (Mental Hygiene)	
	Psychology of Adolescence	
	The Relation of Good Nutrition to Health	
	Home Planning and Decorating	
	Home and Community Health	
	Textiles—Attractive and Appropriate Clothing	

LIBERAL EDUCATION

Business Certificate Courses

Public Speaking

Business Principles

Economics

Labor Problems

Business Law

Money and Banking

Business Finance

Credits and Collections

Investments

Business English

Business Correspondence

Secretarial Training

Business Psychology

Advertising

Marketing

Salesmanship

Real Estate

Accounting

Factory Management

Engineering Certificate Courses

Aeronautics

Architectural Design

Architectural Drawing

Heating and Ventilating

Mechanical Drawing

Mechanics

Machine Design

Radio

Mathematics

*The courses in Series A and B represent types from which a certain number will be offered each semester. They may be modified or other courses added as the occasion demands.

The University committee sponsoring this program of liberal education courses is composed of the following:

GLENN FRANK, President of the University
ALEXANDER MEIKLEJOHN, Chairman, Experimental College
V. A. C. HENMON, Professor of Psychology
J. H. KOLB, Professor of Agricultural Economics
CHESTER D. SNELL, Dean, University Extension Division
W. H. LIGHTY, Director, Department of Extension Teaching
C. M. PURIN, Director of Extension Division, Milwaukee
M. G. LITTLE, Assistant Dean, Extension Division
M. R. SCHNAITTER, Associate Professor of Economics, Milwaukee

DESCRIPTION OF COURSES

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule which will be issued each semester.

BUSINESS

GENERAL

350M. Business Principles.

A broad view of modern business organization and management may be gained through this course, which lays a foundation for the more specialized courses in business. It is designed for those who are fitting themselves for executive positions and is also particularly helpful to anyone just starting in business. Among the subjects discussed are: recent trends in the marketing of manufactured products; organizing for production; scientific management; some modern manufacturing policies; managing personnel; wages and joint relations; launching business enterprises; managing the finances of a business; making safe investments; reading the financial page; record-keeping; forecasting business conditions; risks of business and ways of meeting them; getting teamwork in a business organization.

355M. Business Economics.

Economics, "the scientific study of industry and business," is presented in this course through the use of actual business cases, with discussions of the principles involved. The course deals almost entirely with current problems of industry and commerce. Each case or problem introduces certain economic principles which are discussed in the light of actual factory, store, and office experience. In this way economic relationships are brought before the student in a practical manner. Some of the subjects discussed are: the organization of business units; advantages and disadvantages of large scale units of production and marketing; advantageous location of business units; distinctive factors entering into the demand for, and the supply of, various commodites and services; credit and banking; insurance; investments; and taxation.

139M. Business Statistics.

The principal objective of this course is to develop the student's ability to undertake the statistical analysis of a business problem. The topics discussed include: sources of business information; classification and tabulation; charting; and the preparation and interpretation of statistical reports. The major portion of the time is spent in a study of the various methods of graphical presentation.

196M. Business Psychology.

This course is aimed at a common-sense, practical explanation of what people do, especially **why** they do it,—particularly as related to the problems of modern industry. The discussion includes such subjects as: recent developments in scientific selection and placement; of what value are "psychological tests;" factors contributing to the success or failure of an individual; what and how important is "personality" and can it be developed or changed; what constitutes good training of assistants; problems in dealing with people such as the superior-subordinate relationship, and vice versa, in situations involving rebuke, discipline, and criticism; and understanding "difficult" people through the knowledge of some of the common mental mechanisms, such as inferiority feelings, etc.

360M. Corporation Management.

Among the topics discussed are: the position of the corporation and its widespread use; limitations of the individual proprietorship; how to incorporate; formation of corporation charters; charter object clauses; how a corporation is dissolved; organization of a trust and holding company; rights, duties, and responsibilities of stock-holders, officers, and directors; practical steps in organizing; promotion and underwriting; investment of capital funds; working capital; operating budgets and financial standards; preparation of corporation reports. This course is intended for officers of corporations and those interested in the management of a corporation.

7M. Beginning Public Speaking.

This is a practical course to help business and professional men and women in their speaking, both in public and in private. A maximum of platform work is required of each student. The theory offered is applied, immediately, to actual speaking situations. The course is designed to teach the individual to prepare and deliver speeches creditably.

707M. Advanced Public Speaking.

This course is offered to those who desire to become better than average speakers. A study is made of the principles of psychology which underlie successful speech, and these principles are tested out in class speaking. Each student undertakes to refine his voice, to polish up his delivery, and to acquire those fine points of technique which are indicative of a good speaking style. It is given for those who have had an elementary course in speech.

ACCOUNTING

21M. Accounting for Executives.

This survey of accounting is provided for executives, investors, and others who are primarily interested in analyzing and interpreting the operating and financial facts of a business. The usual courses in accounting, designed for training those who expect to practice bookkeeping and accounting, contain

so much problem work that they are unsuited to the needs of those executives and investors who wish a more general knowledge of the subject.

Throughout the course the function of accounting in depicting the condition of the business occupies the foreground. A thorough foundation is, however, laid in the construction of accounts, in accounting records, and in sources of accounting facts.

No previous knowledge of bookkeeping and accounting is required. Students who plan to prepare to work as bookkeepers and accountants should not take this course; they should start with Accounting 1M.

1M. Introductory Accounting.

This course is primarily intended for those who have no knowledge of bookkeeping. It may be taken advantageously, however, by anyone who has had a half year of high school bookkeeping or who has not studied the subject for some time.

Some of the topics treated are: form of the journal; analyzing the transactions into values received and values parted with; recording these values in the journal; explanations in the journal; debit and credit; form of the ledger; the account; posting to the ledger; trial balance; profit and loss statement; balance sheet; the working sheet; closing the ledger; the direct method of closing; the journal method of closing; accounting for unused fuel and unused office supplies; accounts with proprietor; classification of accounts; principles of debit and credit; notes receivable and notes payable; indorsement of notes; interest on notes; purchase journal; sales journal; cash journal; the advantages of special journals; merchandise discounts; the three-column cash journal; opening books; nature of the partnership; partner's drawing and investment accounts; division of profit and loss; bank drafts; sight drafts; time drafts; trade acceptances; the note register; bank discount; discounting notes; insurance; sundry general expense; accounts with real estate; depreciation; controlling accounts; accruals; C. O. D. shipments; consignments; trade discounts.

2M. Introductory Accounting.

Some of the topics covered are: vital distinction between capital and revenue; depreciation and accounting for discarded or replaced assets; bad debts; revenue accounts and operating statements for a single department business; operating and non-operating income and expenses; cash journal; retail accounting; departmental revenue accounts; petty cash; analysis of the balance sheet; the comparative balance sheet; comparative operating statement; installment sales; the corporate form of organization; capital stock; the stock book; opening the financial books of a corporation; increase and decrease in capital stock; dividends; corporation bonds; treasury stock; non-par stock; manufacturing revenue accounts; the voucher system; incorporating a partnership; introduction to cost accounting.

Prerequisite: Accounting 1M or one year of bookkeeping in high school.

3M. Accounting Principles and Practice.

The purpose of this course is to round out and complete the study of accounting fundamentals embraced by the regular first year's course. Practice sets are not used, but the student is introduced to more difficult problem material. A study is made of the following subjects: early development of bookkeeping; single entry; single entry profit and loss; development of double entry; classification of accounts; the accounting period; realized and unrealized profits; operating and extraneous profits; deferred and accrued items; working papers; statement of cost of goods manufactured; profit and loss and surplus statements; balance sheet; comparative statements with percentage analysis; ratios; turnovers; partnerships; division of partnership profits; advantages and disadvantages of corporations; trusts as business companies; entries for stock issues; premium and discount; forfeited subscriptions; bonus stock; stock issued for property; purchase of business; organization expense; treasury stock; no-par-value stock; dividends; controlling accounts; factory ledger; private ledger; installment sales; agencies and branches; consignments; single and joint ventures; corrections of profits and surplus; counterbalanced errors; errors not counterbalanced; working papers and adjusted statements.

Prerequisite: Accounting 2M or its equivalent.

4M. Accounting Principles and Practice.

This is a continuation of Course 3M. Considerable advanced problem work is assigned, and several new statements are studied. Partnership accounting is considered at length, including dissolution, admission of partner, retirement, sale of business, incorporations, liquidation, and liquidation in installments. Other topics covered are: insolvency and bankruptcy; receivership; accounts and statements of insolvent concerns; statement of affairs and deficiency account; realization and liquidation account, old and new form; realization profit and loss account; charge and discharge statement; statement of application of funds; adjustments; working papers; statement accounting for variation in net profit; valuation of inventories; retail method; gross profit method; profit on uncompleted work; notes and acceptances receivable; contingent liability on balance sheet; methods of computing interest and discount; accounts receivable; methods of computing average data; internal check for cash.

Prerequisite: Accounting 3M or its equivalent.

5aM. Auditing.

This course is designed for those who are interested in acquiring a practical knowledge of the principles of auditing. Anyone who has a thorough knowledge of accounting principles and practice may enroll. Students taking the evening courses in accounting are qualified to take this course after they have completed Accounting 4M.

Some of the topics treated are: balance sheet audits; detailed audits; how to begin an audit; division of work between junior and senior; the audit

program; working papers; branch auditing; auditing from trial balance and from original records; auditing asset accounts; auditing the liability accounts; the auditor's report; auditor's certificates; practical application of principles by a study of actual cases.

5bM. Auditing.

The student is given the complete working papers of a balanced sheet audit carried through the working trial balance and is required to prepare exhibits and a report. The following topics are treated: audit of current and capital assets; nature of the examination with particular reference to the preparation of working papers; current and capital liabilities; limitations and possible scope of an audit; opening and closing an audit; preparation of reports; duties and responsibilities of the auditor; the detailed audit; purchases and expenses; trial balances; assets and liability items; office methods; depreciation; scope of investigations; a sale or purchase of a business; requirements; period covered; analysis of earnings and expenses; future requirements and economics; system of accounts; elimination of unusual items; adjustments and qualifications; errors in the books; investigation on behalf of a retiring partner when the business is being sold to a continuing partner; investigation of those in charge of reorganizations; investigation for creditors; examination for bankers; investigations after bankruptcy; investigation for purely credit purposes; investigation in patent litigation.

Prerequisite: Auditing 5aM or its equivalent.

9aM. Cost Accounting.

Course 9aM is intended for those who need to know cost accounting, either as an aid in performing their duties in manufacturing plants or as preparation for public accounting. It is open to students who have a thorough knowledge of accounting principles and practice. Students who have completed Accounting 2M will be admitted, although candidates for the certificate in Accounting must have completed 3M and 4M also.

Some of the topics covered are: what cost is; what cost accounting is; control of cost records by general books; information presented by statements; necessity for monthly statements; control of sales, cost of expense; divisional cost; elements of cost; cost formulas; departments and department costs; actual, normal, and standard costs; principles of process cost accounting; principles of specific order cost accounting; manufacturing expense; selling and administrative expense; necessity for controlling accounts; voucher register; analysis sheet; cost records; stores ledger; finished parts and finished goods ledger; work in process ledger; manufacturing expense ledger; perpetual inventories; accounting for material; material storage and consumption; calculation of materials, accounting for labor costs; accounting for manufacturing expense; distribution of service department costs; distribution of manufacturing expense to production.

9bM. Cost Accounting.

This is a continuation of the first semester course in cost accounting. A

part of the course consists of practice work on a set of manufacturing accounts. New principles introduced are illustrated as far as possible by the consideration of cases and problems. Some of the topics covered are: preparation of analytical cost statements; comparative statements; handling defective work and spoiled work; accounting for byproducts; containers and packing costs; interest on investment; graphic charts; estimating cost systems; standard costs; uniform cost accounting methods.

Prerequisite: Accounting 9aM or its equivalent.

11M. Advanced Accounting Problems.

In this course extensive practice is given in the solving of difficult problems. Correct analysis, proper form, and training for speed are also stressed. A study is made of the general problems of valuation of fixed assets purchased or constructed; depreciation, obsolescence, and supersession; factors of depreciation; depreciation methods; sale of depreciated assets; repairs and replacements; appraisals; depletion; nature of goodwill and methods of valuation; patents, leaseholds, and other intangible assets; temporary and permanent investments ; types of securities; stock rights; classification of reserves; sinking funds; life insurance; fire insurance; the co-insurance clause. Considerable attention is given to consolidated working papers, balance sheets, and profit and loss statements.

Prerequisite: At least two years of accounting.

402M. Federal Income Tax.

An intensive study is made of the Federal Income Tax Law as applied to individuals, partnerships, fiduciaries, estates, trusts, and corporations. Careful consideration is given to the explanation of gross income, exempt income, net income, taxable income, and to what constitutes proper and allowable deductions for the various classes of taxpayers. Practical problems are worked out in class for all kinds of returns so that the members will become thoroughly familiar with the various phases of the income tax law. The interpretation of the different points of the law is continuously changing because of the issuance of new Treasury regulations, Board of Tax Appeals rulings, court decisions, and changes in the law itself. The course embodies the latest changes. Especial attention is given to the important problems arising under the administrative section of the law. The requirements of the law with respect to accounting procedure are also given careful consideration.

135M. C. P. A. Problems.

This course is designed for advanced students of accounting, and particularly those who are preparing to take the examinations for the Certified Public Accountant's license. It provides practice in meeting the conditions of the examination room where the candidate is required to work rapidly, with limited information, and often with unusual situations.

Problems and questions which have been selected from various state C. P. A. examinations are assigned at each meeting. The solving of these

problems affords a review of a large portion of the field of accounting. The solutions and the accounting principles involved are quite fully discussed in class.

BUSINESS LAW

101M. General Elementary Law and Contracts.

Topics treated: legal divisions and legal terminology; definition of rights, wrongs, and remedies; the composition of American Law, English Common Law; constitutional and statutory law; the formation of contracts; legality of particular agreements; forms and evidences of contracts; performance, breach; transfer and assignment of contract; damages for breach of contract.

102M. Negotiable Instruments and Sales of Personal Property.

Negotiable Paper: Bills of exchange, promissory notes, and checks; elements essential; transfer responsibility of indorsers; protest; notice of dishonor; holders in due course; payment and discharge.

Sales of Personal Property: Contracts of sale defined; transfer of title; warranties in sales; rights of third persons; effect of acceptance on rights of buyer; remedies.

103M. Agency and Corporations.

Agency: The law of agency as fundamental to partnerships and corporations whose activities are carried on by agents and servants; law of agency as applied to principal and agent and to master and servant.

Corporations: Legal advantages and disadvantages; charter, how procured; powers and authority of corporation; duties of officers; rights, duties, and disabilities of stockholders and directors; laws of different states; foreign corporations; trusts and monopolies; dissolution of corporation.

104M. Real and Personal Property, Bankruptcy.

Law of Real and Personal Property: Estates in real property, sale, mortgage, lease; devolution of title upon death of owner, by inheritance, by will. All the phases of ownership and transfer of real property of importance to the layman are covered. Students will be expected to draft deeds of sale, mortgages, and leases.

Debtor, Creditor, and Bankruptcy: Rights of creditor against debtor and debtor's property; forms of indebtedness; methods of enforcing claim; debtor's exemptions; discharge of indebtedness; bankruptcy.

MARKETING AND ADVERTISING

501M. Marketing Practice.

The policies and the procedure used in moving manufactured products from the producer to the consumer are discussed in this course. It deals with the basic problems of market organization and market strategy, leaving the technique of personal selling and of advertising to specialized courses in those subjects.

Special attention is given to such practical problems as choosing a method of distribution; market analysis; price policies; resale price maintenance; unfair competition; and installment selling. Among the other topics covered are types of retail outlets, including the unit store, the specialty store, the department store, the mail-order house, the chain store, and house to house selling; wholesale dealers in manufactured products; the extent to which middlemen may, and may not, be eliminated; marketing problems of the manufacturer.

This discussion is particularly suited to the needs of those who are employed in advertising, sales, and credit departments.

502M. Advertising Procedure.

The subjects treated include advertising as an economic force; factors determining kind and extent of advertising; analysis of market, product, and competition; assignments in copywriting; chief psychological factors involved; buying motives; classes of advertisements; testing relative value of appeals; nature, purpose, and structural principles of various kinds of advertising copy; trade-marks; color and illustrations; typography; principles of layout; media; outdoor advertising; direct-by-mail advertising; the advertising agency; analysis and discussion of actual advertisements.

504M. Advertising Campaigns.

The economic aspects of an advertising campaign; critical analysis of copy and appeal to be used in the various stages of the campaign; case problems selected from successful campaigns, both newspaper and magazine, local and national in scope; direct and mail-order advertising; the place of house organs and dealers' aids in the campaign; color and illustration; and determining the advertising appropriation are studied in this course. Members of the class are required to work out a complete campaign involving selection of sales outlets, choice of media, buying of space, ordering of illustrations and engravings, and all other details connected with a complete campaign. Reference is made to current advertising literature.

500M. Salesmanship.

Everyone in business has something to sell, whether it be goods or services or ideas, and knowing how to sell is a sure way of winning success. Among the subjects covered in this course are: analysis of the article to be

sold; the pre-approach; getting attention; overcoming objections; dealing with competition; appealing to buying motives; closing the sale; the personal qualifications of the salesman; organizing and working a territory.

503M. Selling Life Insurance.

Training and knowledge are as essential in life insurance selling as in any other profession. The emphasis in this course is on selling principles that have stood the test of actual use. Among the topics covered are: fitting the approach to the prospect; replying to typical excuses during the approach; preparing for the interview; determining the proper kind and amount of coverage; handling the written presentation; ways to close different types of prospects; special aids in dealing with hard-to-close prospects.

506M. Sales Management.

Cutting the cost of distribution is a subject of vital interest to American business. This course helps not only the sales manager and his assistants, but is of value to bankers, accountants, production men, advertising men, and salesmen who are looking toward positions of responsibility. The course covers the mechanics of sales planning and operation, from the organization of the sales department through to sales campaigns and tactics. Especial attention is given to the selection, training, and handling of salesmen.

507M. Retail Store Management.

The rapid changes which are taking place in the field of retailing make it absolutely necessary that the independent merchant in the relatively small store know more about his business than ever before. He must know what to watch, how to control the merchandising activities in his store, by what methods he can make sure of operating his store at a profit. This course is organized with those purposes in view. It does not include the complicated methods of large store operation. It shows how small stores can use good merchandising methods without increasing costs. Among the subjects discussed are: layout; display; mark-up; expense control; avoiding wastes; advertising; salesmanship; credits and collections; meeting competition.

Each member of the group has an opportunity to work out the problems which affect his own organization. In this way, as well as through the group discussions, he gets definite, practical help from the course.

Business English and Business Correspondence, see page 48.

BUSINESS ENGLISH AND BUSINESS CORRESPONDENCE

799M. Everyday English.

This is a non-credit course in the fundamentals of the English language. Special emphasis is placed on drill in the rules of grammar and the correct expression of everyday English. The course is mainly intended for those who recognize their deficiencies in speech and writing, and others whose errors

in English are handicaps in everyday life. Students who are prepared and who wish credit should take English 1a. Those wishing a course in English specifically applied to the problems of business life should take Business English and Business Correspondence.

700M. Business English.

This course is designed for business people who desire to improve their knowledge of spoken and written English. Salesmen, stenographers, office people, and those generally who are engaged in business find the course useful in the cultivation of accuracy of expression. It includes the study of the fundamental rules governing correct expression, sentence structure, paragraph structure, common grammatical errors, the use and abuse of slang, and the form and composition of a good business letter. For those who desire to specialize in the particular application of English to business transactions, the course serves as a necessary introduction to the more advanced course in Business Correspondence.

702M. Business Correspondence.

Writing effective business letters requires the use of good English and good judgment. This course trains the student to write more clearly, concisely, correctly, and forcefully. It also explains the strategy that is needed in each important type of business letter. What to say is emphasized as much as how to say it.

The course is designed for dictators, secretaries, stenographers, and, in general, for those who wish to progress toward responsible correspondence positions. It is a logical sequel to the course in Business English.

Actual business letters are analyzed, and practice is given in writing routine letters, adjustment letters, credit and collection letters, sales letters, and letters to salesmen. Attention is paid, also, to giving the letter an attractive, modern appearance.

FINANCE AND CREDIT

137M. Business Finance.

A study is made of the method of financing a going concern by the issue of stocks, bonds, short time notes, and the use of bank loans. From this point, inquiry proceeds into the financial problems of promotion, combination, merger, insolvency, receivership, and dissolution. An attempt is made to outline safeguards against financial losses including insurance and accounting control, and to analyze causes of business failure and methods of reorganization.

401M. Credits and Collections.

Credit can safely be granted to a firm only on the basis of exact information about the condition of its business. The facts needed can be obtained from financial statements, the credit rating books, special reports, and in other

ways, all of which are thoroughly covered in this course. Methods used by credit men in analyzing balance sheets and profit and loss statements are studied intensively, the major part of the course being devoted to this subject. Credit insurance, credit letters, and credit office routine are also examined, but in less detail.

In the study of collections, these topics are covered: causes of delinquent accounts, collection methods, collection letters, the collection agency, and the adjustment bureau. Emphasis is laid upon getting the money without losing the customer.

403aM. Investments.

The principal objective of this course is to equip the student with certain principles which will aid him in the investing of his own funds or the funds of others. The work begins with an outline of economic fundamentals as applied to the field of investments. Standards are developed by which securities may be measured, and application of these standards is made to the formulation of an investment policy for the individual, for the corporation, and for the institution. Individual securities are examined in the light of these principles, and typical investment accounts are constructed. Since the scope of the course is general, only a minimum amount of time is given to the interpretation of balance sheet and profit and loss statements. A more complete and detailed financial analysis is reserved for the advanced course.

403bM. Investments. (Advanced Course).

This more advanced course is designed for those who have a foundation in the fundamental concepts of investing. The problem of the successful commitment of funds is approached from two different angles. In the first place, a study is made of the methods by which balance sheets and profit and loss statements are analyzed with respect to investment merit. Individual statement items are analyzed and compared; attention is directed to the meaning of various ratios and trends; and inquiry is made into the existence of and the methods of estimation of hidden assets.

In line with the second objective of the course, a study is made of the various industries with respect to the opportunities presented for a profitable return on funds. A survey of the advance and recession of investment advantages in certain fields is followed by an inquiry into the present major activities in production and distribution, and an attempt is made to outline the favorable and unfavorable factors for a half-dozen or more of the leading industries of the United States.

Prerequisite: Students should not register for this course without having taken the following courses or having had their equivalents: Business Finance 137M or Investments 403aM, and Accounting 4M or Accounting 21M.

Corporation Management, see page 40.

Business Statistics, see page 39.

INDUSTRIAL MANAGEMENT

601M. Factory Management.

The factory executive's task has been aptly defined as "delivering the product that is wanted, when it is wanted, at a minimum cost of production." To accomplish this task successfully he must adopt modern methods of planning, operation, and control.

The following topics are, therefore, covered in this course: the internal organization of a manufacturing concern; locating, equipping, and laying out the plant; providing proper light, heat, and ventilation; system and symbolization; production control, including planning, routing, scheduling, and dispatching work through the factory; quality control (inspection); making time and motion studies; maintenance work; material control; purchasing, receiving, storing, and issuing material; inventory control; salvaging; simplification and standardization in manufacturing; relations between the planning and cost departments.

Cost Accounting 9aM and 9bM, see page 43.

SECRETARIAL WORK

714M. Secretarial Training.

The duties required of a secretary to the business and professional man are outlined. Instruction is given in the performance of such duties, together with practical projects and assignments selected to train the student in the basic principles of business associated with secretarial work. The course is planned to assist stenographers and officer workers who desire to advance into secretarial work; to give secretaries additional experience in handling varied executive duties; and to acquaint anyone interested in secretarial work with the fundamentals of secretarial practice.

The subjects treated in this course are: secretarial education requirements; essential mental, moral, and physical qualities; the "time" element; handling and interviewing callers; making and supervising appointments; diaries and recording books; clerical duties of the secretary; organizing dictation and transcription; postal information; mailing procedure; the technique of telephoning; a study of important reference books; office appliances; editing dictated matter.

Shorthand and typewriting are not taught in this course.

715M. Advanced Secretarial Training.

The advanced course in Secretarial Training includes continued discussions and presentation of the theory and fundamental principles of secretarial work. Criticism and advice in individual problems are given. The greater part of the course is devoted to dictation projects including the following: summarizing correspondence and reports; civil service information; the technique of filing and indexing; source material for employer's speeches; constructing interesting letters from employer's "hints" or notes; a thorough

mastery of technical business terms from both a vocabulary and dictation standpoint; shorthand dictation with typewritten transcripts of letters, reports, statistical data, and artistic display-work. The dictation presented covers a training course in stenographic practice and secretarial procedure in representative lines of business in Milwaukee.

Prerequisite: Secretarial Training 714M or consent of instructor.

REAL ESTATE

306M. Fundamentals of Real Estate Practice.

Real estate values compose nearly half of our national wealth. They are constantly changing, as they are affected by population growth, industrial development, and environment. This is the first course of the program of real estate education sponsored by the Milwaukee Real Estate Board and the National Association of Real Estate Boards.

The discussion includes the following topics: the real estate market; the value of real estate; apartments and business structures; industrial property; city planning; forecasting city growth; finding property and prospects; financing real estate transactions; building and loan associations; mortgages; selling real estate.

307M. Real Estate Law

Real Estate Law is of particular value to the real estate man inasmuch as it forms such a basic part of real estate activity. A careful analysis of the deed, for instance, and a discussion of all its elements provides an indispensable familiarity with the topic. A treatment of mortgages in the same manner provides information equally valuable. The course discusses such fundamental legal subjects as deeds, mortgages, leases, fire insurance, listing contracts, sales agreements, and agency relations. It concludes with an explanation of different kinds of interest in real property and a discussion of the abstract.

308M. Real Estate Transfers and Conveyancing.

Much of the work of transferring real property follows the unwritten law. Consequently, exercises in the actual making of transfers and conveyances are of the greatest value to the real estate man. This course consists principally of actual work in drawing up instruments of conveyancing, particularly various kinds of deeds and mortgages and long-time and ordinary leases. Action to quiet title is followed through carefully, and the required instruments are drawn. Methods of terminating leases by written notice and unlawful detainer also receive complete treatment. A discussion of government land titles, government patents, and the U. S. Geological Survey conclude the work.

Real Estate Law must be taken before Transfers and Conveyancing by those who wish credit toward a Real Estate Board Certificate.

309M. Real Estate Financing.

Success in the real estate business is largely dependent upon the skill

with which transactions are financed. Automobiles, radios, furniture, and many other things that are sold on easy payments take a large share of the income of the average American family. To an increasing extent these goods are competing directly with real estate. Consequently, in almost every real estate deal credit is a vital factor.

This course is especially useful to real estate brokers and salesmen; to officers and employees of banks, investment houses, mortgage companies, and building and loan associations. It includes practical information on the financing of homes, small stores, industrial sites, office buildings, subdivisions, and apartment houses, including co-operative apartments; the sources of funds for real estate loans; sound appraisal methods; choosing of profitable sites; financial houses furnishing real estate funds, their requirements, organization, and methods of operation; forms of real estate credit; mortgages, land contracts, bond issues, and participation certificates; ground rent systems and long-term leases; and the part played by building and loan associations in financing home ownership.

310M. Real Estate Appraisals.

Correct appraisals are not only fundamental but very essential to success in the real estate business. This course emphasizes the economic theory of scientific appraising as well as its practical application to every form of real estate appraisal.

These topics are discussed: economics of value; economic foundation of real estate value; elements of real estate value; income and real estate value; appraisal procedure and methods; computation of new income; appraisal of income property; appraisal of lease equities; depreciation and obsolescense; comparative value analysis; appraisal reports; and appraisal ethics. Hypothetical as well as actual appraisals of Milwaukee property are made by the class. At least one long form appraisal report is written by each student.

311M. Real Estate Selling.

Real estate selling is no longer a haphazard process. It has become a scientific procedure. The salesman must be prepared to sell the service of the realtor and of his own organization. He must be able to analyze the realty he is to sell and the market for it. He must be able to carry out his firm's selling policies and to cooperate with its advertising. Finally, he must understand the actual steps in making a sale. In covering these subjects, this course helps not only the salesman to make sales, but it also aids him in progressing toward sales management and eventually a business of his own.

ENGINEERING AND TECHNICAL SUBJECTS

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule which will be issued each semester. Courses marked with an asterisk (*) involve credit toward a university degree.

AERONAUTICS

Aero 1. Aeronautics, Elementary.

This course offers an introduction to the fundamental principles of flight and aerodynamics. A study is made of the characteristics of airfoils, streamlining, parasite resistance, airplane performance, and the newer developments such as the autogyro, wing slots, floating ailerons, etc.

Problem work involved in the design and selection of airplane components constitutes a large portion of the course in conjunction with class discussion.

Prospective students should preferably have training in algebra and physics equivalent to high school graduation. The course is recommended to those who want accurate information relative to the theory of operation of the modern airplane. Pilots will find this course and the following excellent preparation for the Department of Commerce examination on Airplanes.

Aero. 2. Aircraft Construction.

A study is made of types of construction of wings, fuselages, propellers, and landing gears. The materials used for this work will be gone into, and the student will be given an opportunity to fabricate sample ribs, fittings, welded joints, and wire and tie rod connections. Arrangements have been made with Milwaukee flight organizations to permit the class to inspect dismantled planes and assist in their alignment

Aero. 3. Airplane Engine Theory and Details.

The principles of the internal combustion engine as applied to aircraft engines are studied together with reasons for modern engine arrangement. Carburetion, ignition, fuels, lubricants, supercharging, and factors influencing weight, power, fuel economy, and reliability are studied.

Aero. 4. Airplane Engine Maintenance.

Practice is given in the checking, overhauling, and maintenance of modern engines. Methods of trouble shooting are given which should enable a student to do maintenance work on his own airplane engine or to gain experience toward obtaining an engine mechanic's license.

Aero. 5. Aviation Law and Insurance.

Technical and legal problems involved in the operation of flying schools, airlines, and air mail routes are studied, together with functioning of the Aeronautics Branch of the Department of Commerce. Air traffic rules, boundary and customs regulations, insurance, public liability, and property damage are also covered.

Aero. 6. Cost Accounting in Aviation.

Cost accounting as applied to airplanes, airports, airways, and equipment is taken up in this course. Work is given in depreciation problems, replacement policies, and repair and maintenance budgets.

Aero. 7. Meterology and Air Navigation.

A study of the weather and factors influencing it is made, followed by an investigation of the magnetic compass and dead reckoning navigation. Aircraft instruments and radio are also studied. This course is particularly recommended to pilots who wish to prepare for the transport pilot's examination.

Aero. 8. Special Problems in Aero Engineering.

In this course work is taken up which will be of the most benefit to the student in the work he is engaged in. The following are suggested as suitable problems: simplified propeller design; certain aspects of stress analysis; prediction of performance; selection and combination of propeller, engine, and airplane for various operations.

Aero. 9. Drafting in Aero Engineering.

A study is made of the graphical methods employed in stress analysis, together with propeller layout and general aircraft drafting.

This course is to be taken in conjunction with the course in Special Problems.

ARCHITECTURAL AND BUILDING

1aM. Architectural Design.

Design, in so far as it should indicate the character of the building, whether political, religious, or domestic, is taken up in this course. Good design requires grace of form, articulation of parts, proportion and emphasis, these qualities all being dependent upon outline, mass, color, and detail. It comprises the use of both Greek and Roman Periods and the Periods that follow, in conjunction with building design.

The following subjects are taken up: plan and elevation development—monumental, commercial, and residential; interior design in the various pe-

riods; application of moldings, decoration, color schemes; furniture designs in rooms of a given period; esquisse-esquisse problems and developments; color presentation drawings; criticism on problems with chalk talks.

1bM. Architectural Design.

Course 1b is a continuation of the first semester's work. It is open to new students who are properly prepared.

Prerequisite: Course 1aM or its equivalent.

243aM. Architectural Drawing.

Besides teaching the subject of drawing as applied to architectural work, this course gives considerable valuable information on details of building construction and architectural practice. It takes up first the principles of drawing, illustrating the most important methods used in architectural work. The student is then given practice in the designs of details of a moderate sized house from which he makes many of the drawings. These cover such details as walls or frame, brick veneer, solid brick, plaster walls; basement sash, casement sash, and casement door head; floor construction, tile and wood; stair sections; fire-places; cabinet drawing; heating and plumbing layout.

243bM. Architectural Drawing.

This is a continuation of the first course in architectural drawing. Special attention is given to the proper proportion in design and in presentation by means of drawings. Elements of design, including stairs, general details, plan figuring and readings, plumbing, radiation, and heating layouts for hot water, steam, and vapor are made. The course takes the student through the design of a specified residence from the start.

Prerequisite: Course 243aM or its equivalent.

240M. Acoustics and Insulation.

The most recent developments in the field of acoustical correction, sound deadening, and insulation will be studied. The construction and materials used will be taken up from a practical viewpoint, and typical problems will be solved. Architects, draftsmen, builders, and constructional engineers should be interested in this course.

Experience in general constructional work and a knowledge of elementary algebra are desirable.

430M. Concrete Mixtures (Laboratory course).

There are eight sessions devoted to laboratory tests of cement, aggregates, and concrete mixtures. Special tests and demonstrations are conducted covering the following items: selection of materials for concrete; water-cement ratio proportioning; design of mixtures by the trial method; field control. The class designs mixes and makes batches of concrete for various

types of construction. These batches are tested for compressive strength at 7 days and 28 days. Time is allotted for class discussion of the tests and their application on construction jobs.

474M. Concrete Work.

This course is for practical workers in concrete. Among the topics treated are: cement aggregates; pit run gravel; proportioning; quantity of material needed for cubic yard of concrete; hand mixing; machine maxing; placing of concrete; placing of steel; erection of forms; simple footings; column footings; concrete walls; field tests of concrete; concreting in hot and cold weather; lumber sizes in forms; bending; reinforcing; bonding steel in concrete; remixed and retempered concrete; and patching concrete.

417aM. Concrete, Reinforced.

The fundamentals in the design of slabs, beams, and columns are covered in this course. Some of the topics treated are: aggregates; proportioning; design of concrete mixtures; quantities of material; strength; steel and concrete in combination; flexure formulas; working stresses; diagonal tension; bond stress; designs of simple beams with tension reinforcement; design of slabs; T-beams, and beams with steel top and bottom; design of columns reinforced with bars only and with both bars and spiral reinforcing.

Prerequisites: Courses 450aM and 450bM or their equivalent.

417bM. Concrete, Reinforced.

This is a continuation of Course 417aM and applies the theory to the design of various structures.

The topics treated are: general types of concrete floors; floor loads; economic considerations; small openings; roofs; columns; bearing walls; retaining walls; window openings; basement walls; stairs; and foundations. Numerous designs are worked out and drawings made.

Prerequisite: Course 417aM or equivalent.

497aM. Estimating for Builders.

The practical methods of estimating used by builders and contractors are taught in this course. Instruction is given in the reading of blueprints and designs as well as in the fundamentals of arithmetic. Plans for small buildings are furnished, and the student carries through a systematic estimate of all material and labor quantities. He is instructed to use judgment in estimating the quantities of brick, lumber, glass; to make proper allowance for unavoidable waste in construction; to analyze cost data for similar work and arrive at certain unit costs; to make the proper tabulations, addition, and multiplication in order to arrive at the direct cost.

497bM. Estimating for Builders.

This subject is treated from the standpoint of the builder and contractor. The student should have ability to read plans or blueprints and have a fair

knowledge of building operations. The course is confined to reasonably large buildings of reinforced concrete, steel, and wood (mill-type construction). A complete set of blueprints, together with the specification of some large building in Milwaukee, is acquired by the student, and the work of the semester is directed to the preparation of quantity surveys and estimate of the labor required for the different types of construction. This course is a continuation of Course 497aM. It is open to new students who are sufficiently prepared. The course in Architectural Drawing is of value if taken during the same semester.

Prerequisite: Course 497aM or its equivalent.

Heating and Ventilating, see page 63.

CHEMICAL ENGINEERING

291M. Metals and Alloys.

Many engineers, particularly in the field of mechanical engineering, are called upon to specify metals and heat treatments in connection with their design work. It is often true that the engineer with such a responsibility has but a limited knowledge of the basic principles of metallography and heat treatment, and must rely on others for guidance. The content of this course is designed to meet the needs of men who wish to acquire an understanding of the fundamental principles of the science of metals, and a knowledge of the properties of metals and alloys of industrial importance.

A knowledge of elementary chemistry is the only requirement for enrollment.

Among the topics treated are: pure metals of industrial importance; recrystallization phenomena; the crystalline state in metals; the interpretation of alloy constitution diagrams; a brief outline of steel making processes; the thermal critical points of iron and steel; the iron-carbon constitution diagram; annealing, normalizing, hardening, and tempering of carbon steel; case hardening and nitriding of steel; impurities in iron and steel; gray and malleable cast iron; case hardening and structural alloy steels; plain carbon and alloy tool steels; tungsten carbide; corrosion resistant alloys; heat resistant alloys; the structure and properties of welds; brass; bronzes; bearing metals; light aluminum alloys.

CHEMISTRY

2a. General Chemistry.* **4 credits.**

Two hours lecture; two hours recitation; four hours laboratory. Lab. fee and deposit, $15.

This course is designed to offer a broad foundation in the chemical and related sciences. The properties and reactions of non-metals, acids, bases, and salts are studied with special emphasis on the fundamental laws and theories.

2b. General Chemistry.* **4 credits.**

Two hours lecture; two hours recitation; four hours laboratory. Lab. fee and deposit, $15.

A study is made of the inorganic chemistry and qualitative analysis of the common elements. Special emphasis is given to the principles underlying the analytical procedures.

Prerequisite: Chemistry 2a.

14. Quantitative Analysis.* **3-5 credits.**

Three or four credits, lab. fee and deposit, $20; five credits, lab. fee and deposit, $25.

Chemistry 14 is a course in the essentials of quantitative analysis. The student analyzes naturally occurring ores and commercial materials.

Prerequisite: General Chemistry, including qualitative analysis.

CIVIL AND STRUCTURAL, SEE PAGES 54, 68, 72 and 73

CONCRETE, SEE PAGE 56

DRAFTING, SEE PAGES 54, 58,and 59

DRAWING

Architectural Drawing, see page 55.

1. Elements of Mechanical Drawing.* **3 credits.**

Laboratory fee, 50 cents.

Topics treated: theory of orthographic projection; reading problems; free-hand sketching; working drawings; vertical lettering; tracing.

2. Elements of Mechanical Drawing.* **3 credits.**

Laboratory fee, 50 cents.

Topics treated: problems involving the conventional drawing of machine elements and the use of the irregular curve; sketches of machine parts, followed by detail and assembly drawings and tracings; slant lettering; blue printing; isometric drawing; standard drafting room practice.

Prerequisite: Drawing 1.

(Courses 1 and 2 may be elected for credit by students in the College of Letters and Science.)

3. Descriptive Geometry.* **3 credits.**

Topics treated: fundamental theory of point, line, and plane, with application to solids; generation and classification of lines and surfaces; tangent planes; sections, intersections, and developments.

Prerequisite: Drawing 2.

7a. Freehand Commercial Lettering.* **1 or 2 credits.**

Topics treated: accurate, large-scale construction of the Roman capitals, which are the basis of most commercial forms; proper serif proportions; principles of spacing; Roman small letters in composition; methods of laying out work to secure balance, uniform tone, and even margins; single-stroke letters in pencil and ink; use of various letter forms for posters and other types of advertising display.

This course does not count toward the 120 credits required for graduation from the general courses in the College of Letters and Science. It may be taken for credit in the Course in Applied Arts.

203M.Sp. Freehand Industrial Sketching.

Freehand Industrial Sketching is a course which will be useful to mechanics, draftsmen, engineers, executives, salesmen, laboratory technicians, or anyone engaged in technical or industrial work who has need for freehand orthographic or pictorial sketches as a means of giving information to others.

It will be assumed that the student is already familiar with the proper placing of views, the making of sectional views, and the use of symbols and conventions. The student's success in this course will depend upon the care with which he follows the technique for using the materials and the self-discipline with which he follows a definite orderly procedure.

The course indicates the necessary procedure for making sketches to be used in conferences with executives, designers, inventors, and draftsmen, and for the sketching of parts needed for repairs, improvements, additions, or changes in equipment or structures, or for laboratory records.

Topics treated: sketching procedure; fillets and circles; miscellaneous forms and details; axonometric sketching; parallel, two point, oblique, and measured perspective sketching; sketching small objects or single parts from models; sketching large objects and assembled units; pictorial representations from plans; machine shop, mill, factory, and yard layouts; tone drawing by accented lines; shading by lines and stippling; drawing aids and devices; renderings of structures and settings; and laws governing the construction of reflections.

Drawing Outfit.

One H pencil, one No. 112 Ruby eraser, and one pad 8½x11 in. plain white paper.

ELECTRICAL

311M. Direct Current Machinery.

The elementary principles involved in the construction and operation of direct current generators and motors are considered. The principles are explained in connection with their practical applications without the use of higher mathematics or questions of design. An elementary knowledge of algebra and trigonometry is desirable. The instruction covers electromagnetism, units of measurement, the continuous current generator and motor, com-

mutation, characteristics of generators, operation of generators, operating characteristics of motors, three-wire systems, selection and installation of dynamos.

312M. Alternating Currents, Theory of.

This is an elementary course in the fundamental principles of alternating currents. The course deals with phenomena that are found in the operation of alternating current machinery and apparatus. Although a minimum amount of mathematics is used, nevertheless a working knowledge of the elements of algebra and trigonometry is necessary for good work in the course. A knowledge of elementary electrical theory and of direct current circuits is prerequisite.

Among the topics treated are: fundamental principles; properties of sine curves; vectors and sine curves; flow of alternating current; power in alternating current circuits.

Radio, see page 70.

HYDRAULICS, SEE PAGE 66

MACHINE DESIGN

1. Machine Design* (Mechanism). **4 credits.**

Among the topics treated are: motion and velocities, instantaneous centers, relative linear velocities, velocity diagrams, cams, gearing, and belting.

Prerequisite: Mechanical Drawing, 1 and 2.

2. Machine Design Practice.* **1 credit.**

This is a short course treating of the practical considerations of machine design. Study is made of the use and application in design of engineering material, formulae, and tabulated data, together with a discussion of factor of safety and allowable stress.

Prerequisite: Machine Design 1.

208M. Mechanism.

Mechanism is the study of the motion of the parts of a machine and is sometimes called "the geometry of machinery." Only such mechanisms will be studied as are of practical application. Mechanics, strength of materials, and machine practice will be introduced only so far as is necessary to the thorough understanding of the mechanism studied.

The subjects studied include linkages, cams, gears, belts, wrapping connectors, and intermittent motions.

Since much careful drawing is required in the course, a good set of drawing instruments is necessary.

Prerequisites: Drawing and Algebra and Trigonometry or their equivalent.

209aM. Machine Design.

The principles of mechanics, mechanism, and strength of materials in the design of machine parts are studied in this course.

Introducing the subject, such topics as materials, loads, stresses, factor of safety, elastic limit, modulus of elasticity, and moment of inertia are studied. Typical elements of machines used as examples in applying principles are: beams; columns; rivets and riveted joints; screws and bolts; keys, lubricating devices; bearings; belt and rope drives; toothed gearing; friction clutches and brakes; shafting; springs; cylinders; and plates.

Prerequisite: Mechanics 206M or equivalent.

209bM. Machine Design.

The work of this course is based upon the instruction given in Course 209aM as a prerequisite. Students who have not completed Course 209aM but who have had other machine design instruction may enroll for Course 209bM with the permission of the instructor.

The subject matter of the course, based upon a recent outstanding machine design text, covers the following general topics: design of shafting under various conditions of loading, concentration of stress in fillets, and fatigue of metals due to varying stresses; strength of spur, bevel, and worm gears; friction brakes, friction clutches, friction wheels, belt drives, and rope drives; design of machine frames for strength and rigidity; design of flywheels for inertia, capacity, and strength; stresses in thick cylinders; stresses due to force fits; a brief consideration of static and inertia forces in connection with rotating and reciprocating machine parts; safety engineering in design.

A selection of suitable problems accompanies the above theory.

211aM. Vibration Problems in Engineering.

This course is for engineers and designers who feel the need of a subject dealing with the analysis and solution of various vibration problems encountered in mechanical engineering design.

The fundamentals of the theory of vibration are developed, and their application to the solution of technical problems is illustrated by various examples taken, in many cases, from actual experience with vibrations of machines and structures. For systems having one degree of freedom, the following topics are treated: free and forced vibrations; forced vibrations with damping and their technical applications; balancing of rotating machines; the energy method of studying vibration problems; Rayleigh method; critical speed of rotating shafts; free and forced pseudoharmonic vibrations; quasi-harmonic vibrations. For systems with more than one degree of freedom, the following are some of the topics taken up: the vibration of vehicles; torsional vibrations of shafts and geared systems.

Prerequisite: Differential and Integral Calculus 54 and Integral Calculus 55.

212M. Mathematics Applied to Practical Engineering Problems.

This course is planned to meet the needs of draftsmen and designers who desire a reading and working knowledge of mathematics beyond their present foundation of algebra and trigonometry. Most familiar handbook formulas in daily use are based on comparatively simple physical laws. In developing these principles and putting them into working form, methods of analysis and reasoning common to higher mathematics are made use of.

It is the purpose of this course to combine the processes of mathematics and the materials of familiar engineering problems in a series of practical procedures from physical principles to handbook formulas.

Prerequisites: Mathematics 13, Mechanics 206, Strength of Materials 207, or their equivalent.

MATHEMATICS AND ASTRONOMY

13aM. Algebra and Trigonometry.

In this course the elements of algebra and trigonometry are taken up so as to develop the student's skill in solving the simpler problems in practical work.

In the algebraic work the fundamental operations are stressed, and the solution of quadratic equations included. In the trigonometric work care is taken to develop skill and accuracy in computation and in the solution of simple problems involving the use of the law of sines and the law of cosines.

13bM. Algebra and Trigonometry.

This is a continuation of Mathematics 13aM. The algebraic work is continued so as to include logarithms and the use of the slide rule. The trigonometric work consists of solving more advanced problems in the solution of triangles.

50. Subfreshman Algebra. **No credit.**

The topics covered include square root, quadratic surds, solutions of quadratic equations, simultaneous equations involving quadratics, logarithms, progressions, and the binomial theorem. The course is required of all students who do not pass the examination given to all freshman engineers.

51. Elementary Mathematical Analysis.* **5 credits.**

This course is required of all freshmen in engineering. Applicants for admission will be required to pass an examination in algebra, given shortly after the opening of the semester.

The course includes: functions; rectangular coordinates and the straight line; the power functions; the circle and the circular functions; ellipse; hyperbola; single and simultaneous equations; permutations and combinations; binomial theorem; progressions. A thorough review is given at the close. The course gives prominence to the fundamental truths of elementary analysis. Graphing is emphasized.

52. Elementary Mathematical Analysis.* **5 credits.**

Course 52, Elementary Mathematical Analysis, is regularly required of all freshmen in Engineering and is a continuation of Mathematics 51. The course covers: logarithmic and exponential functions with applications; trigonometric equations and the solution of triangles; simple harmonic motion and waves; complex numbers; locus problems; and a brief course in conic sections.

Prerequisite: Mathematics 51.

54. Differential and Integral Calculus.* **4 credits.**

All Engineering sophomores are required to take this course.

Content of course: review of functions and processes taken up in Mathematics 51 and 52; the derivative, its meaning and application; limits; the power function; differentiation of algebraic functions; second derivative applications; infinitesimals; definite integrals; circular functions; inverse circular functions; exponential and logarithmic functions; maxima and minima; polars; integration.

Prerequisite: Mathematics 51 and 52 or their equivalent.

Mathematics Applied to Practical Engineering Problems, see page 62.

55. Integral Calculus.* **4 credits.**

This course is required of all sophomore engineers and is a continuation of Mathematics 54.

Content of course: advanced integration; successive integration; center of gravity; moment of inertia; curvature; series; total derivatives; exact differentials and a brief introduction to differential equations.

Prerequisite: Mathematics 51, 52, 54, or their equivalent.

Note: Mathematics 54 and 55 may be taken by Letters and Science students instead of Mathematics 5.

Astronomy

6. Navigation.*

This course is designed for students who wish an elementary course in Practical Astronomy or who wish to become familiar with the methods by which the position of a ship at sea is determined. Some of the subjects taken up are: instruments used in navigation; latitude of Polaris; latitude by a meridian altitude of the sun; azimuth; longitude by a time sight of the sun or a star; the method of Marc St. Hilaire; the line of position.

Prerequisite: Trigonometry.

MECHANICAL AND INDUSTRIAL

223aM. Heating and Ventilating.

This course is offered, primarily, for architects, architectural draftsmen, engineers, contractors, estimators, and others who feel the need of a prac-

tical course which will help them to plan, estimate, and install heating and ventilating systems in the various types of buildings. It is, however, of value to anyone interested in heating and ventilating problems.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics and the ability to use simple formulas are required. Much time and work will be saved if the student is able to use the slide rule.

Topics treated: heat, temperature, specific heat, expansion of solids, liquids, and gases; heat loss from buildings, radiation, conduction, convection, infiltration, exposure factors, coefficients of heat transmission; heat loss calculations, comparison of rules and methods for figuring heat losses; different methods of heating, advantages and disadvantages of the different methods; warm air furnace heating, fan furnace systems, furnace ratings, pipeless furnace, calculations and design, factors affecting installation and operation, recirculation system, combined heating and ventilation systems as applied to residences and other types of buildings; properties of steam, pressure, evaporation, steam tables, heat of the liquid, latent heat, total heat of steam, specific volume and density; radiators, coefficient of heat transmission, painting, material, location, methods of calculation, indirect and direct-indirect radiators; boilers, classification, types, ratings, selection, safety and economy; steam heating systems, vapor, air line and vacuum; pipe fittings, valves and accessories, commercial pipe, fittings, valves and insulation; flow of steam in pipes and pipe sizing, sizing of piping for the different types of steam heating systems.

223bM. Heating and Ventilating.

This is a continuation of the first course in Heating and Ventilating.

Topics treated: hot water heating, heat loss and radiation, temperature of water, hot water boilers, gravity, pressure, and forced circulation systems; hot water piping, general details of piping, the area method of pipe sizing, pipe sizing for closed tank systems, Honeywell, D and T, Thrush and Mueller system, size of valves, mains and risers, basement radiators, branch connections, separate returns; problems in steam heat design, heat losses, radiation, pipe and valve sizes and plan; problems in hot water heat design, heat losses, radiation, pipe and valve sizes and plan, central station or district heating systems, general information on these types of systems; temperature and humidity, general information and methods of control, types of apparatus, and applications; air and its properties and ventilation; study of the conditions of the air and application to ventilating systems; fan systems, as used for heating and ventilating, fans, heating and tempering coils, Vento heaters, humidity and temperature control, air washers, cold and warm air ducts, unit heating systems; problems in design of fan systems, heat loss, direct radiation, Vento radiation, size of fan, ducts; plans and specifications; piping; pipe sizes, fittings, valves, air valves, insulation, testing of system; fuels and combustion, coal, oil, gas, and their use in heating systems.

Prerequisite: Course 223aM or equivalent.

222M. Refrigeration.

This is an elementary course and is planned for a thorough study of the fundamental principles of refrigeration. For the student who has had no instruction or experience in refrigeration it provides a good foundation for advanced study. The course should also prove interesting to those who feel the need of a review of the fundamental principles of refrigeration.

The work is based on a standard text which may be purchased through the Extension Division. Mimeographed material used in the course is supplied by the Extension Division.

The work of the course contains many calculations and, therefore, a good knowledge of elementary mathematics and the ability to use simple formulas are required. If the student can use the slide rule, he can save much time in making the many calculations involved.

A general statement of the topics treated follows: mechanical and electrical units; heat; change of state; heat involved in the process of refrigeration and unit of refrigeration; principles of mechanical refrigeration; properties of refrigerants; complete compression machine, details of compression machine, and operation of compression machine; direct and indirect refrigeration; absorption system of refrigeration and properties of aqua ammonia; the complete absorption system and its operation; ice-making; economics of refrigeration; insulation; cold storage construction; air circulation and piping of cold storage rooms; cold storage of dairy and other products; automatic or household refrigeration machines.

224M. Mechanical Equipment of Buildings.

In the design and construction of the modern building there is involved the selection and installation of various types of mechanical equipment.

Under the present methods of construction each trade installs its particular type of equipment, its general knowledge of all types of mechanical equipment being rather meager.

This course is planned so that the student who is interested in building construction and the selection and installation of mechanical equipment may have an opportunity to study and discuss the various types of equipment so necessary to the successful completion of the modern building.

The work is based on a standard text which may be purchased through the Extension Division. Mimeographed material used in the course is supplied by the Extension Division.

The following outline gives a general idea as to the topics treated in this course: the different types of heating systems and their application to particular types of buildings; the small power plant for a building; selection of boilers, ash and coal handling machinery, automatic instruments, chimneys, and oil burners; refrigeration machinery; plumbing and plumbing aids; elevators; electrical equipment, involving conduit, wiring, motors, and lighting systems; vacuum cleaners; pumps; laundry and kitchen equipment.

All of the above topics have many subdivisions which are considered during the course.

235M. Hydraulics of the Plumbing System.

Hydraulics of the Plumbing System is intended mainly for master plumbers, inspectors, water department meter readers, foremen, and others in responsible charge of work. Those who have had some training in physics and hydraulics will find the work of interest and value. However, an attempt is made to present the basic principles so that all may understand. Any man who is seriously interested in his job will benefit by doing the work.

Prerequisite: High school algebra or its equivalent.

Topics treated: the action of water and air in water supply, meters, pumps, vent pipes, and appurtenances; friction loss and discharge of pipes and elbows; sudden expansion and contraction and other specials; the causes of water hammer, its measurement and methods of reducing its effect; the action of the siphon and its application to the plumbing system; a study of certain recent plumbing installations and sanitary waste disposal; water supply needed for a given project; fire prevention; drains and vents; sumps and ejectors; and other special problems.

The class will be expected to go to the Hydraulic Laboratory of the University for several days of actual laboratory experiment work, the length of time and the amount to be done depending upon the progress of the class.

221aM. Internal Combustion Engines, Theory and Design.

This is a treatment of the theory and design of the modern internal combustion engine. After a brief review of some elementary thermodynamics, a detailed study is made of the theoretical aspects of both the Otto and Diesel cycles, with special attention to the fuel, combustion, and detonation problems encountered in modern engines.

The instruction is based upon an authoritative textbook used in conjunction with periodicals, research bulletins, etc. Among the topics treated are: fundamental thermodynamic principles; laws of gases and vapors; study of the working mixture; fuel and air; the Otto cycle; study of cycle events; the ideal diagram; study of lines on diagram; the Diesel cycle; reciprocating and rotary motion; engine balance; cylinders; combustion chambers; detonation; pistons, piston rings; crankshafts; bearings; bearing loads and lubrication; connecting rods, cooling systems, valves and valve gear; crankcases; flywheels; manifolds; mufflers; other details; automotive type Diesel engines; two cycle engines; airplane engines; engine tests.

Prerequisite: Prospective students should consult the instructor or submit a complete statement of training, education, and experience for his consideration. As a minimum, prospective students should have a mathematical preparation covering algebra, geometry, and trigonometry, drawing, strength of materials, mechanics, mechanism, and machine design, together with some practical experience with internal combustion engines.

221M(Special). Internal Combustion Engines, Modern Developments.

This course, which is conducted on the seminar or round table discussional basis, consists of a consideration and study of the outstanding recent de-

velopments in the field of the Internal Combustion Engine as brought out in the current literature on the subject. The literature and accomplishments in this field are studied with the assistance of trade literature, research pamphlets, proceedings of engineering and technical societies, and similar records of developments. In addition, from time to time, leading authorities on certain phases of internal combustion engine work are invited to take part in the class discussion.

In general, the subject matter covers the important current and modern developments in the theory and practice of the internal combustion engine. The final details of the various subjects to be discussed are determined after the first meeting of the class.

At some time during the progress of the course, each member of the class may be asked to contribute a paper or to present a discussion on some important subject to be assigned.

Because of the advanced character of the work, enrollment in this course is limited to those who have the proper training, experience, and background to take part in the discussion and to profit from the proceedings of the class. Admission to the class will be limited. Prospective students should consult the instructor before enrolling. In general, the background of a four year engineering course, or a substantial equivalent will be prerequisite for admission to the course.

Shop Laboratory Courses, see page 71.

230M. Thermodynamics, Elementary.

Course 230M is offered especially to teach the applications of heat energy to the problems of power production. The fundamental considerations underlying heat and heat energy are studied in connection with their practical applications to power machinery, its design, construction, and operation.

The very nature of the subject matter requires that the student have a good mathematical preparation. As a minimum, he should be able to handle algebraic formulas and should have a good working knowledge of logarithms. In addition it is desirable that he be able to use a slide rule.

The following topics are treated: fundamentals of heat energy and its transformation; force; work; energy and power; transmission of heat; generation of heat; application of heat energy in modern power plants; fundamental energy relations; gases and their laws, special applications to compressed air plants; internal combustion engines; vapors, their properties and laws; thermodynamic processes of vapors; steam cycles, application to steam engines and turbines; reheating, regenerative, and binary cycles; refrigerating machines.

This course suits the requirements of properly prepared students for a first course in elementary applied Thermodynamics. It is also an excellent review for those who have had previous instruction in the subject, and desire some of the modern applications.

Vibration Problems in Engineering, see page 61.

MECHANICS AND MATERIALS

1. Statics.* First half semester. **3 credits.**

Prerequisite: Physics 51.

2. Dynamics.* Second half semester. **2 credits.**

Prerequisite: Mechanics 1, enrollment in or completion of Mathematics 55.

206aM. Elementary Mechanics. (Statics).

The course in Elementary Mechanics develops in the student a knowledge of fundamental facts and theories as well as ability to apply this knowledge to practical problems. It is of value to the shopman since it teaches him the underlying principles of the processes and machines which he uses. To the draftsman it gives an ability to analyze the forces in a projected machine or structure. The application of forces to cranes, derricks, bridges, and roof trusses is covered both graphically and analytically. Some time is also devoted to the mechanics of gases and liquids.

Prerequisite: Drawing 2, Algebra, and Trigonometry.

206bM. Elementary Mechanics. (Dynamics and Properties of Materials).

This is a continuation of Course 206aM given in the first semester. The subjects studied in this course are: motion and forces that produce changes in motion; moment of inertia; radius of gyration; work; power; energy; friction; general laws of machines; elasticity and its relation to the strength of beams, columns, and shafts. Consideration of all these subjects as they arise in different aspects in design will be given in the solution of many practical problems.

Prerequisite: Course 206aM or equivalent.

207M. Strength of Materials.

Course 207M is intended for those who aspire to be machine designers or structural or architectural draftsmen. The student should have a good working knowledge of arithmetic, elementary algebra, and the rudiments of trigonometry. He should be familiar with the use of the slide rule and should have one of the standard steel handbooks for reference.

Topics treated: properties of materials; simple stresses; elastic properties; cylinders, pipes, and riveted joints; center of gravity and moment of inertia; beams, reactions; shear; bending moments; columns; general reference tables.

207M. Sp. Advanced Strength of Materials.

This course is planned to meet the needs of engineers engaged in structural and mechanical design for an adequate and practical treatment of the more difficult types of problems encountered in practice.

The analyses of simple cases—axial stress, bending of straight beams, torsion of circular shafts, etc.—are critically reviewed and the limitations of the ordinary formulas pointed out. More difficult cases, such as curved beams, flat plates, thick cylinders, and rotating discs, are taken up, and the applications of the theory illustrated by examples taken from practice. Special methods of experimental stress analysis, such as the photo-elastic method, the membrane analogy in torsion, and the use of elastic models, are explained and discussed.

Some time is given to a review of the results of recent and current research in the properties of materials, especially as concerns fatigue, creep at elevated temperatures, and plastic resistance.

Physics Laboratory

Throughout, the object is to reduce the results of theoretical analysis and of experiment to practical, usable formulas, and to give a clear idea of the theory or experiments on which each formula is based, the circumstances under which it is applicable, and the probable accuracy of the results it yields.

Prerequisites: The instruction in this course is of an advanced character and is especially intended for those who have had undergraduate courses in strength of materials in a college of engineering or have had practical experience in the industrial or engineering field which qualifies them to pursue profitably advanced instruction. Prospective students who are doubtful of their preparation should consult with the instructor at the first meeting of the class.

274M. Elementary Ferrous Metallurgy.

The first part of the course consists of a discussion of the fundamental principles involved in the manufacture and fabrication of iron and steel. The occurrence of iron as an ore and the metallurgical chemistry involved in obtaining the metal are explained. Various important ferrous products are considered, the metallurgy involved in their manufacture given, and their properties and uses discussed, all from the standpoint of their physical construction.

Lectures are used to explain the material in as simple a way as possible. The text is followed rather closely but is supplemented by practical information gained from the personal experiences of the instructor. Discussion of the various points are encouraged.

Topics Treated: Occurrence of iron; treatment of ores; metallurgical chemistry; the blast furnace; ferrous products from pig iron; steels: Bessemer process—acid; Bessemer process—basic; basic open hearth process; special open hearth processes; electric furnace process; alloy steels; foundry irons; the iron carbon system and its physical chemistry.

The **textbook** to be used is **Elements of Ferrous Metallurgy** by Rosenholtz.

PHYSICS

51. General Physics.* **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

Mechanics, heat, magnetism, and static electricity are taken up in this course. The course is required of civil, mechanical, and chemical engineers.

Prerequisite: Students must have completed or be taking Mathematics 52.

52. General Physics.* **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

Current electricity, sound, and light are treated in this course. The course is required of civil, mechanical, and chemical engineers.

Prerequisite: Physics 51 and Mathematics 54 or concurrent registration in Mathematics 54.

RADIO

3M. Current Radio Developments.

This course is designed for students who are familiar with the fundamental principles of electricity and who have a good working knowledge of the principles of radio communication and wish an opportunity to familiarize themselves with the more recent developments in Radio. The review of current books, proceedings of the various engineering societies, manufacturers'

research bulletins, government publications, technical and popular magazines pertaining to all phases of radio are taken up. About twenty-five periodicals are reviewed in class discussion and by lectures. Demonstrations where necessary are provided.

The aim is to make the work extremely practical by closely studying present day tendencies in new circuits, tubes, service helps, testing, and laboratory methods, as well as looking ahead toward new applications, such as television, photo-electric cells, navigational wireless, wired-radio, public address systems, beam transmission, Piezo crystals, electron theory, and "talkies." The course is offered primarily for experienced radio service repairmen, technicians, radio salesmen, laboratory workers, and radio amateurs, but is extremely interesting to the "fan" and even the serious-minded layman.

A few representative titles of the long list of periodicals used are: Proceedings of the Institute of Radio Engineers, Proceedings of the American Institute of Electrical Engineers, Scientific American, Q S T, Radio Engineering, Electronics, Bell System Technical Journal, Experimental Wireless and Wireless Engineer, Radio Retailing, Radio Broadcast, and Radio.

RAILWAY ENGINEERING

1. Railway Curves.* **2 credits.**

The computation and field location of simple, compound, and spiral curves, and of railway turnouts are covered in this course.

Prerequisite: Trigonometry and Elementary Surveying.

SHOP LABORATORY WORK IN ENGINEERING

Required in Mechanical Engineering Course: Nos. 1, 2, 4, 5, and 6.

Required in Mining Engineering Course and Chemical Engineering Course: Nos. 1, 2, 4, and 5.

1. Elementary Pattern Making. **1 credit.**

Lab. fee, $3.

Elementary Pattern Making covers bench and lathe work in wood, principles of molding and core making, and a knowledge of common woods.

2. Bench Work, Forge, and Welding. **1 credit.**

Lab. fee, $3.

Instruction is given in the use of bench metal tools, acetylene and electric welding, splicing, soldering and drill press work, pipe fitting, welding, tempering, and brazing.

4. Lathe Work in Metals. **1 credit.**

Lab. fee, $3.

Instruction is given in turning, boring, thread cutting, and the working of various metals.

5. Planing, Shaping, and Milling. **1 credit.**

Lab. fee, $3.

Surfacing, slotting, and gear cutting are taken up.

6. Tool Making. **2 credits.**

Lab. fee, $6.

Taps, reamers, counterborers, turret lathe tools, etc., are made and tempered. Prerequisites: Shop 4, 5.

STRUCTURAL

422aM. Steel Design and Details.

In this course the fundamentals covered in structural theory are applied to the actual design of a structure.

During the semester the student designs a mill building. The design covers the roofing, purlins, trusses, columns, footings, walls, bracing, and crane runway. Design drawings, details of joints and connections, and weights of various parts are computed. Window and door openings are treated in connection with the corrugated iron covering for the walls.

422bM. Steel Design and Details.

The student at first becomes familiar with the design of beams under moving loads and impact. He then makes a complete design of a highway bridge girder and later a design of a highway bridge truss.

Prerequisite: Courses 450aM and 450bM or their equivalent.

450aM. Structural Theory.

This course is intended for architectural draftsmen and designers, construction superintendents, and others whose work calls for an analysis of the forces in simple structures. The instruction covers the use of formulas and tables in such a way that the strength of simple members of timber and steel may be computed by the student.

Among the topics treated are: the fundamental principles governing the selection of tension and compression members, using the Carnegie Handbook as a guide; riveted joints and bolted connections; the use of graphic static in the solution of problems involving reactions.

450bM. Structural Theory.

This is a continuation of the course given during the first semester. The work, however, is arranged so that students may enter the course the second semester.

Among the topics treated are: concurrent forces; equilibrium; resultants and components; non-coplanar forces; non-concurrent coplanar forces; types

of trusses; dead, snow, and wind loads; stresses in trusses; algebraic and graphical solutions; friction.

Prerequisites: A working knowledge of trigonometry.

Reinforced Concrete, see page 56.

SURVEYING, SEE PAGES 73 and 74.

Civil Engineers

TOPOGRAPHIC ENGINEERING

(See Also Railway Engineering, page 71)

1. Elementary Surveying.* **2 credits.**

Lab. fee, $4.50.

The theory and practice of pacing, taping, and leveling are studied in this course.

2. Elementary Surveying.* **2 credits.**

Lab. fee, $4.50.

Classroom work and field practice in the use and adjustment of the engineer's levels, surveyor's compass, and transit are dealt with in this course.

Prerequisite: Course 1.

3. Land Surveying.* **3 credits.**

Lab. fee, $3.

Content of Course: theory and field practice in the use of transit, sextant, and plane table, in problems relating to land surveying; the effect of lack of

adjustments; instrumental inaccuracies and their elimination; methods used in original land surveys, city surveys, and resurveys. The field work is followed by office practice in computations arising from common surveying problems, in plotting field notes, and in making maps.

Prerequisite: Course 2 and Trigonometry.

104. Advanced Surveying.* **3 credits.**

Lab. fee, $4.50.

The following topics are taken up: mining, topographic, and hydrographic surveying, stream gaging, and field astronomy; field practice in solar and stellar observations, topographic surveying, and mapping. (Completion of this course admits the student to the University of Wisconsin Summer Survey Camp.)

Prerequisite: Course 3.

108. Short Course in Surveying.* **3 credits.**

Lab. fee, $4.50.

This course is planned to meet the needs of students in mechanical and electrical engineering for a general study of surveying. It may also be taken by students in mining engineering and some other courses. It includes topographic, hydrographic, and land surveying, with field practice in the use of tape, level, and transit.

410M. Surveying.

Lab. fee, $2.25. (For students in the two-year course in Building Design and Construction.)

The first half of the semester is devoted to classroom work and the second half to outside problems. The student learns the use of the tape, level, and transit. After completing this course he should be able to run ordinary levels, give grade for construction, stake out building foundations, and estimate quantity of earthwork.

LETTERS AND SCIENCE

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule which will be issued each semester. Courses marked with an asterisk (*) involve credit toward a university degree.

BIOLOGY

Study in the biological sciences is conducted in the co-ordinated departments of Botany, Physiology, and Zoology, which are here combined to form the Department of Biology.

The laboratory science requirement may be removed by taking Botany 1 and Animal Biology 1. Either one may precede the other, although the normal order is to take Animal Biology 1 followed by Botany 1. (See Botany 1 and Animal Biology 1.)

1. General Botany.* **5 credits.**

Two hours lecture; two hours quiz; six hours laboratory. Lab. fee, $6.

The course in General Botany is preliminary to all advanced work. It is accepted with Animal Biology 1 to make up an elementary course in general biology.

1. Elements of Human Physiology.* **4 credits.**

Three hours lecture; two hours laboratory. Lab. fee and deposit, $3.

This is an introductory course giving a general knowledge of the structure and functions of the human body, and of foods, nutrition, hygiene, and laws of health. It is intended primarily for students desiring this knowledge as a part of their general educational equipment, and for home economics students. This course deals with the fundamental processes of cells and tissues generally, muscular activity, circulation, respiration, digestion, secretion, excretion, metabolism, the nervous system, and the special senses. There are lectures, quizzes, demonstrations, and laboratory work. This course may be taken for 3 credits (laboratory omitted) with the consent of the instructor.

Prerequisites: Sophomore standing and either Animal Biology 1 or Chemistry 1a and 1b. (Chemistry 1b may be taken concurrently.)

For home economics students: Sophomore standing and Chemistry 1a and 1b.

1. Animal Biology.* **5 credits.**

Three hours lecture; one hour quiz; six hours laboratory. Lab. fee and deposit, $7.

This course is preliminary to all advanced work in Zoology. A study is made of biological principles as illustrated by animals. The cell theory, adaptations, physiology, embryology, heredity, and evolution are considered.

The laboratory work includes a survey of the various animal groups from the simpler to the more complex, with special emphasis upon the anatomy, physiology, histology, and embryology of the frog.

Animal Biology 1 and General Zoology 2 combined or Animal Biology 1 and Botany 1 combined satisfy the natural science requirement.

2. General Zoology.* (Not offered in 1931-32) **5 credits.**

Two hours lecture; two hours quiz; six hours laboratory. Lab. fee and deposit, $7.

This course is supplementary to Animal Biology 1. Consideration is given to the completion of the survey of the main types of animals, with reference to their classification, structures, life histories, and relations to man. The laboratory work involves dissection and study of representative forms including the embryo pig; each student works out a simple genetic problem.

Prerequisite: Animal Biology 1.

CHEMISTRY

1a. General Chemistry.* **5 credits.**

Two hours lecture; two hours recitation; six hours laboratory. Lab. fee and deposit, $17.50.

The course in general inorganic chemistry begins with the study of nonmetals and of the fundamental principles of chemistry.

Chemistry Laboratory

The topics covered are: common elements; oxygen; water; hydrochloric acid; chlorine; chemical theories and laws; chemical equations and calculations; ozone; hydrogen peroxide; the halogens; acids; bases; salts; the atmosphere; ammonia and other nitrogen compounds; nitric acid; sulphur and sulphuric acid; carbon and carbon compounds; hydrocarbons and their derivatives.

In the laboratory, the important non-metals are studied. Attention is given to bleaching agents; common acids of commercial value; ammonia and other common bases; neutralization; purification of water; fuel gases and important by-products of coal gas.

1b. General Chemistry and Qualitative Analysis.* **5 credits.**

Two hours lecture; two hours recitation; six hours laboratory. Lab. fee and deposit, $17.50.

A study is made of the inorganic chemistry and qualitative analysis of the common elements. Special emphasis is given to the principles underlying the analytical procedures.

Prerequisite: Chemistry 1a.

11. Quantitative Analysis.* **3-5 credits.**

Three or four credits, lab. fee and deposit, $20; five credits, lab. fee and deposit, $25.

Chemistry 11 is a course in the essentials of quantitative analysis. The student analyzes naturally occurring ores and commercial materials.

Prerequisite: General Chemistry, including qualitative analysis.

20. Organic Chemistry.* **2 credits.**

Three hours lecture-recitation.

Organic chemistry is the chemistry of the hydrocarbons and their derivatives. The division of chemistry into two fields, that is, organic and inorganic, rests on the fact that carbon compounds originally found in nature were associated with living organisms, while the other or inorganic compounds were associated with rocks and minerals. Today we know that a vital force is not necessary for the formation of the carbon compounds, and that the chemistry of the two fields is the same. The division today is purely one of convenience.

Courses 20 and 21 should be taken concurrently.

Prerequisite: Chemistry 1 or 2.

21. Organic Chemistry.* **2 credits.**

Six hours laboratory; lab. fee and deposit, $20.

Prerequisite: Credit or concurrent registration in Chemistry 20.

117. Inorganic Preparations.* **1-4 credits.**

One credit, lab. fee and deposit, $10; two credits, lab. fee and deposit, $15; three or four credits, lab. fee and deposit, $20.

This course covers the fundamental principles of chemical manipulation and advanced general chemistry. The experimental work done will give the student:

First A grasp of the fundamental principles on which chemistry is based;

Second An understanding of the various types of reactions employed in inorganic chemistry;

Third A knowledge of the chemistry of the important types of inorganic compounds;

Fourth Greater familiarity with laboratory technique and apparatus. The discussions and reports will familiarize the student with the literature of inorganic and physical chemistry and assist him in expressing his findings clearly and concisely.

Prerequisite: 1a and 1b or 2a and 2b.

DRAWING

1. Elements of Mechanical Drawing.* **3 credits.**

Lab. fee, 50 cents.

Topics treated: theory of orthographic projection; reading problems; freehand sketching; working drawings; vertical lettering; tracing.

Drawing Laboratory

2. Elements of Mechanical Drawing.* **3 credits.**

Lab. fee, 50 cents.

Topics treated: problems involving the conventional drawing of machine elements and the use of the irregular curve; sketches of machine parts, followed by detail and assembly drawings and tracings; slant lettering; blue printing; isometric drawing; standard drafting room practice.

Prerequisite: Drawing 1.

7a. Freehand Commercial Lettering.* **1 or 2 credits.**

Topics treated: accurate, large-scale construction of the Roman capitals, which are the basis of most commercial forms; proper serif proportions; principles of spacing; Roman small letters in composition; methods of laying out work to secure balance, uniform tone, and even margins; single-stroke letters in pencil and ink; use of various letter forms for posters and other types of advertising display.

This course does not count toward the 120 credits required for graduation from the general courses in the College of Letters and Science. It may be taken for credit in the Course in Applied Arts.

ECONOMICS

1a. General Economics.* **4 credits.**

The purpose here is to focus attention upon certain basic principles and problems, an understanding of which will make the student better able to understand the present economic system. An introductory section is devoted to a study of the place of economic activities with respect to the great fields of social activities and to the distinctive features of modern economic life as compared with earlier times. Following this, a study is made of business organizations, small-scale and large-scale production, methods of determining fair capital value and reasonable capitalization. A similar study is made of labor organizations; the economic aspects of labor union policies, and employers' association policies, industrial conflict (together with the legality of methods used by employers and laborers), and the various plans operating to better industrial relations.

Prerequisite: Sophomore standing.

1b. General Economics.* **4 credits.**

Following the more elementary discussion of principles and problems given in Economics 1a, this course takes up more advanced subjects. The first part deals with the economic theory of distribution and the relation of this theory to wages, interest, rent, and profits. The economic problems considered in this connection are the personal distribution of wealth and income, general price changes, and business cycles. Attention is given to consumption and the factors affecting consumption and saving. Consideration is given to problems in the field of public finance, such as taxation, public expenditures, public loans and debts, and to economic policies, such as laissez faire, government control, protectionism, free trade, and control of industrial combinations. The work for the year concludes with a survey of plans for economic reconstruction.

Prerequisite: Economics 1a.

EDUCATION

225. Test Construction.* **3 credits.**

This is a seminar in the application of measurement and other scientific principles and techniques to the analysis of the problem of the maladjusted

pupil. Each student in the course makes a case study of pupils in his school, diagnosing the symptoms of maladjustment, determining their underlying causes, and applying a carefully prepared remedial program of pupil adjustment.

Prerequisite: Junior standing.

221. Seminar in Elementary Education.* **2 credits.**

This course has to do with the technique of study. The work is conducted in the manner of a seminar, which means that it is largely individual.

Those who were enrolled in the course during 1930-31 may take up the work where they left off; new members of the class may take up a problem in which they happen to be interested. Members of the class are expected to prepare definite material, the purpose of which is to direct the study of pupils. In certain subjects and grades, where the work progressed far enough during the past year, controlled experiments will be set up with the purpose of determining the value of material that has been prepared. This will be possible especially in the following subjects and grades: Language and Arithmetic in Grades 7 and 8. Work may be carried on in any subject and in any grade in the elementary or Junior high school.

Prerequisite: Junior standing.

ENGLISH

A. English Composition (See Everyday English, page 47.) **No credit.**

This course is for students who have failed to pass the preliminary test.

1a. Freshman English.* **3 credits.**

The course in Freshman English is recognized as fundamental in a liberal education and is required of all freshmen in all the colleges of the university. It gives the student the basic training which enables him to speak and write correctly. At the same time it emphasizes accurate thinking and skillful expression. The routine work of the weekly themes includes strict drill in punctuation, sentence structure, and the correct use of words. The course also includes the study and class analysis of a few of the best English essays; and reports on outside reading of biography, criticism, letters, and travel.

1b. Freshman English.* **3 credits.**

English 1b is a continuation of English 1a. In the second semester the principles of exposition are studied particularly in relation to the writing of reports of all kinds. Students who are planning to do work in higher courses in English are taught the methods of research, of the preparation of manuscripts, of gathering bibliography, of annotating. Students who are taking technical subjects are instructed in the methods of making technical reports in their special fields.

Prerequisite: English 1a.

2a. Sophomore Composition.* **2 credits.**

This course is fundamental to all advanced writing. It consists largely of student experimentation in various kinds of description. It is designed to train the student in the basic principles underlying the technique of artistic expression. The course also involves some work in the informal sketch and imitative writing.

Prerequisite: English 1b or a grade of "A" in English 1a.

2b. Sophomore Composition.* **2 credits.**

This is a beginning course in narrative writing. It deals with the analysis of the many varieties of narrative, with the application of description to plot structure, and with the writing of narrative themes. It is an experimental course in which the student may find out what types of narrative he can handle best, which interest him most.

Prerequisite: English 2a.

30a. Survey of English Literature.* **3 credits.**

This course (together with 30b) follows the historical plan of study. The selections assigned for reading and study are linked with lectures on the social and literary background from the beginning until modern times. It is designed for students primarily interested in English literature and is recommended for English majors and minors. It fulfills the literature requirement for sophomores who are candidates for the B.A. degree. The semester's work covers the period from Chaucer to Dryden.

Either Courses 30a and 30b or Courses 33a and 33b must be taken as prerequisite for all advanced courses in English literature. A student who has a semester's credit in Course 33 may not elect either semester of Course 30.

Prerequisite: English 1b or a grade of "A" in English 1a.

30b. Survey of English Literature.* **3 credits.**

This is the second semester of a year's course in the historical survey of English literature. It follows the same plan as 30a; reading assignments for each meeting are discussed in class, and the necessary historical and social background is provided by lectures. The semester's work extends from Swift and Defoe up to nearly the present time.

Prerequisite: English 30a.

33a. Introduction to English Literature.* **2 credits.**

This course is intended for those who wish to increase their appreciation and enjoyment of literature. It is a study of the types of great literature and of representative personalities in the literary field from the sixteenth century to our own time. Since the emphasis is on the appreciation rather than on the history of literature, the various authors are not taken up in chronological order. However, about one-quarter of the time is spent in lectures to give

the historical background for the principal authors and to furnish the student with information about the work of these writers which will help him not only in understanding the selections assigned but also in his choice of future reading.

English 33a is parallel to English 30a (General Survey) as a prerequisite to advanced courses in English literature.

Prerequisite: English 1b or a grade of "A" in English 1a.

Library

33b. Introduction to English Literature.* **2 credits.**

Course 33b continues the study of the types of English literature begun in the first semester. Since no such study would be complete without consideration of the drama, the essay, the satire, and the novel, English 33b rounds out the work of the year by emphasizing these types. However, the course is a unit by itself and may be taken as such.

English 33b is parallel to English 30b as a prerequisite to advanced courses in English literature. A student who has a semester's credit in Course 30 may not elect either semester of Course 33.

Prerequisite: English 33a.

37M. Shakespearean Drama.* **2 credits each semester.**

A brief and rapid survey of the development of English drama and its theater leads to a study of the historical and social aspects of the Elizabethan age. Into this background is placed Shakespeare the man, the poet, and the dramatist. The development of his comic genius is studied during the first semester in the following plays: Comedy of Errors, Two Gentlemen of Verona, A Midsummer Night's Dream, The Taming of the Shrew, The Merchant of Venice, Much Ado About Nothing, Twelfth Night, Cymbeline or The Winter's Tale, and The Tempest. In the second semester, after a brief summary

of the influence of Kyd and Marlowe and a glance at their plays, Shakespeare's growth in power to dramatize history and tragedy is considered in the following plays: Richard II, Richard III, Parts I and II, Henry IV, Henry V, Julius Caesar, Hamlet, Othello, and Macbeth or King Lear.

Prerequisite: English 30 or 33.

39. The English Novel.* **2 credits each semester.**

(Not offered in 1931-32.)

This is a year course in the study of the English novel. Lectures in the first semester cover a brief survey of prose fiction to serve as a background to the study of the use of the novel in the Eighteenth Century. Students read widely in the realistic novel of Defoe, the sentimental writings of Richardson and Sterne, the robust works of Fielding, the fantasies of the Horrors School, and the romances of Scott. The types, structure, intention of the author, and the biographical and social backgrounds are considered. The second semester continues this study through the Nineteenth Century to the present day writers.

Prerequisite: English 30 or 33.

For other courses in English, see pages 47, 85, and 86.

GEOGRAPHY

Geography 5 and 6 are consecutive introductory courses in geography, and together they form a unit of work for one year. They are intended primarily for students expecting to enter the School of Commerce, for students in the College of Agriculture, and for those desiring a general cultural background of world geography without laboratory training.

5. Regional Economic Geography.* **3 credits.**

This course includes (1) a brief survey of those elements of natural environment (climate, land forms, soils, etc.) which have the greatest habitat value and (2) the geography of the United States.

It is open to freshmen.

6. Regional Economic Geography.* **3 credits.**

The economic geography of the world outside of the United States is covered in this course.

Prerequisite: Geography 5.

HISTORY

The introductory courses 1, 5, and 10 are the courses open to freshmen. Students may take only one of these courses for three credits a semester, since each contains introductory training for which credit ought not to be given twice; that is, if they have had or are taking one of these courses for full credit, another may be taken from this group for two credits a semester

only, omitting the supplementary reading and a topical report. Students not registered in the College of Letters and Science may take any of the introductory courses for two credits each semester.

1a. Medieval History.* (to 1100) **2 or 3 credits.**

In this course an attempt is made to show the relationship between the three elements of Medieval History: the Legacy of Greece and Rome, the Christian Church, and the Germanic Peoples. The course begins with one element, Rome, already declining, and with another, the Church, just rising, as a political power; the Germans are threatening on the Roman frontier. The growth of the Church as a cultural and political power forms one development, while the advance of the Germans in government and cultural appreciation forms another.

1b. Medieval History.* (1100-1500) **2 or 3 credits.**

Beginning about 1100, the course follows closely the work of the Medieval People in the Crusades and the Town Movement, resulting from trade and industry. The intellectual life is seen in the founding of the Universities and in the studies pursued near them. Medieval literature, Latin and vernacular, is read, and some architecture is viewed. In the political sphere the development of France, England, and Germany, and the conflicts with ecclesiastical powers, find their place. The last six weeks of the course are spent on the Renaissance in its various aspects: painting and sculpture, architecture and literature.

Prerequisite: History 1a or consent of instructor.

5a. English History.* **2 or 3 credits.**

The development of English institutions from the Anglo-Saxon invasions to the death of Queen Elizabeth is traced. Constant comparison with European institutions of the same period makes the course a vertical section of a course in medieval history.

5b. English History.* **2 or 3 credits.**

Course 5b traces the development of English institutions from the accession of James I to the present. Special emphasis is placed on the growth of responsible government and the rise of democracy, the industrial revolution, and the expansion of the English people into new lands to form the British Empire.

Prerequisite: Course 5a or consent of instructor.

10a. Ancient History.* (Oriental and Greek History) **2 or 3 credits.**

Course 10a begins with the development of the two great Oriental centers, Egypt and Mesopotamia, where excavations almost daily bring forth more proof of the greatness of these peoples. The adoption of their culture by the Greeks and the "Classical Era" forms the greater part of the course. The

Persian and Peloponnesian Wars are brought in, but never too much to hinder the studies of cultural development, as we find it in their games and oracles, their plays and songs, their temples and shrines. The social and legal aspects of life are studied in the development of Athenian Democracy as well as in the camp of the Spartan soldier. The course ends while Greece is giving her legacy to Rome, in the Hellenistic Age.

10b. Ancient History.* (Roman History) **2 or 3 credits.**

The course is a study of a people, remarkable for military power and administrative organization. The first part includes Republican Rome, its expansion over the Mediterranean, its great social and economic problems under the Gracchi, and its ultimate failure. The process of reconstruction in the Empire of Augustus receives considerable attention, since it covers almost all phases of Roman life and letters. The Roman legions are followed to the various parts of the known world, where they build roads, and erect temples, aqueducts, and baths, symbols of Roman victory and advance. Some time is spent on the new element, Christianity, as it grows up. The course ends with the "Decline and Fall of the Roman Empire."

Prerequisite: History 10a or consent of instructor.

4a. History of the United States.* **3 credits.**

The development of American nationality from 1783 to about 1840 is traced in this course. The central theme is the formation of a national government and its democratization, but the development of other institutions is not neglected.

Prerequisite: Sophomore standing.

4b. History of the United States.* **3 credits.**

Special emphasis is laid upon the struggle between nationality and slavery, the nationalization of industry, and the entrance of the United States into the field of world politics. The aim of this course is to furnish the intellectual and moral background essential to an understanding of present day problems.

Prerequisite: Sophomore standing.

JOURNALISM

1a and 1b. General Survey of Journalism.* **1 credit each semester**

Practical talks once a week on the character and scope of journalism work, including a consideration of newspapers, magazines, technical and trade journals, agricultural publications, and advertising are given. This course is required of freshmen who intend to enter the School of Journalism.

11M. Magazine Writing

This course covers various types of special feature articles, markets, and methods of selling. Members of the class write a minimum of six articles

which they try to sell before the completion of the course. No work is done with the Short Story.

7cM. Short Story Plotting.

This specialized course carries on the foundation work offered in English 2a and 2b, giving attention to fiction material, the fundamental types of fiction, and plot development. The course encourages the student to begin the process of learning the nature of his own talent and thus tends to shorten the period of preparation for professional success. Each student is helped to set for himself the pace at which his imagination functions best, instead of following set exercises. The work is wholly practical in outlook.

7aM. Short Story Writing.

This course is a continuation of Short Story Plotting. Material gathered and sorted and developed in the previous course is worked out in final form. No cramping limitations of kind or quantity of work are imposed; thus the energetic writer is permitted to prepare himself rapidly under direction and to avail himself of quick and friendly criticism on a mass of manuscript which would otherwise entail considerable expenditure. The theory covers such matters as human interest, point of view, order of events, suspense, surprise, length of stories, illusion of reality—all treated exclusively from the professional, modern angle and illustrated by current published work.

7dM. Short Story Markets.

The student who has completed the course in Short Story Writing is ready to profit fully by this course which opens up the whole problem of where to sell a story and how to go about it. The course is divided into two semesters, the first treating of the market broadly and applying the previous study of plotting and writing to the business end of fiction, the second dealing with those particular markets for which each individual is at present best fitted. Here, as in the preceding courses, the unusual opportunity is now offered of unrestricted production, the student being given help on as many stories and as much fiction material as he is ambitious enough to produce. Conducted in the atmosphere of stimulating class discussion, the work nevertheless remains, as in the preceding course, individual, no member of the class being held back even a day to wait for any other to catch up.

For other courses in English, see pages 47 and 80.

LANGUAGE REQUIREMENT FOR THE B.A. DEGREE

Under the new plan recently adopted at the University of Wisconsin, candidates for the B.A. degree may meet the requirement in foreign language in one of the following ways:

1. By passing examinations in what is known as the minimum or reading examination in two languages.

2. By passing what is known as the Proficiency Examination in one language.

The student is still required to earn 120 credits for graduation, but no specified number of credits must be earned in foreign language. A student may at the time of entrance, or whenever he feels properly prepared, take either the reading examination in two languages or the Proficiency Examination in one language. If he passes, he will be exempt from any further language study, so that the credits which he might have had to earn in language can be earned in other subjects.

Content of Examinations

The reading examination will test the student's ability to comprehend prose in the foreign language of about the difficulty of texts now used in the fourth semester. He will also be required to translate a passage from the foreign language into good English. In addition the student must demonstrate his ability to pronounce the language by reading a passage out loud in the presence of the examiner.

The Proficiency Examination in addition to testing the ability to comprehend the printed page will test the student's knowledge of the literature and history as related to the language involved. There will also be an oral examination to test the student's ability to understand and answer simple questions in the foreign language.

LANGUAGES

French

1a. First Semester French.* **4 credits.**

The primary object of this course is to teach the student to read simple French prose as a foundation skill to which other skills such as speaking, understanding, and writing may be added later. Grammar is presented from the recognition or French-English point of view. The work also includes the acquisition of a vocabulary of 500 words based on the Vander Beke word count, selected idioms from the Cheydleur list occurring in the texts read, pronunciation, ear training.

1b. Second Semester French.* **4 credits.**

The work of the preceding semester is continued with review of grammar, an additional 500 word vocabulary, continued study of idioms, the writing of simple French, oral and aural practice. Attention is given to the culture of the French people.

Prerequisite: French 1a or one year of high school French.

10a. Third Semester French.* **3 credits.**

The primary object of the course is to increase the reading ability acquired in the first year. The vocabulary of French 1a and 1b is reviewed, and the study of idioms based on the Cheydleur list is continued. There is also a

review of irregular verbs and pronunciation. Grammar is reviewed and studied in connection with the texts read and as contributing to their better understanding. Opportunity is afforded for oral and aural practice. Students who expect to benefit most from the course are given an opportunity to do out-of-class reading.

Prerequisite: French 1b or two years of high school French.

10b. Fourth Semester French.* **3 credits.**

French 10b continues the work of Course 10a. Vocabulary study is continued with a second list consisting of 1000 words based on the Vander Beke word count. Attention is given to the literary aspects of the works read with a view toward establishing an appreciation of French literature.

Prerequisite: French 10a or three years of high school French.

15a. Elementary Composition and Conversation.* **2 credits**

This is a supplementary course to be taken with French 10a and 10b. It is not open to students who have had the equivalent of two years of college French, except by special permission.

15b. Elementary Composition and Conversation.* **2 credits.**

This is a continuation of Course 15a. It is open to properly qualified new students.

21a. Elementary Survey.* **3 credits.**

French 21a is a third year course planned to cover French literature in outline, with illustrative readings from the principal periods, movements, and writers. The course includes a study of the literary aspects of the works read, and literary history. This course or its equivalent is prerequisite to all advanced courses in French literature.

Prerequisite: French 10a and French 10b, or four years of high school French.

21b. Elementary Survey.* **3 credits.**

This is a continuation of Course 21a. It is open to properly qualified new students.

German

1a. First Semester German.* **4 credits.**

Training is given in pronunciation in the essentials of grammar and in speaking and writing German as bases for fluent and intelligent reading. Some 70 pages of easy material are read. Type of texts used: **Altes und Neues.**

1b. Second Semester German.* **4 credits.**

The chief emphasis is put on fluency in reading and on oral and written

reproduction of the content in German with fair grammatical accuracy. About 125 pages of prose are read. Type of texts used: **Immensee.**

Prerequisite: German 1a or one year of high school German.

2a. Third Semester German.* **4 credits.**

Reading is done, in class and outside, of some 200 pages of narrative prose. Oral and written reproduction of content in German is stressed. An incidental review is made of the most important grammatical topics. Type of texts used: Ludwig Thoma, **Lausbubengeschichten,** Gronow, **Geschichte und Sage,** and Schiller's **Wilhelm Tell.**

Prerequisite: German 1b or two years of high school German.

2b. Fourth Semester German.* **4 credits.**

Some 300 pages of novelistic and dramatic literature and lyrics are read in class and outside. Oral and written reproduction in German is stressed. Type of texts used: Schiller's **Jungfrau von Orleans,** Sudermann's **Frau Sorge,** and Keller's **Romeo und Julia auf dem Dorfe.**

Prerequisite: German 2a or three years of high school German.

3. Selected Masterpieces.* **4 credits.**

Reading is done, in class and outside. Practice is given in grammar, composition, and conversation. Type of texts used: Grillparzer's **Des Meeres und der Liebe Wellen** and Goethe's **Hermann und Dorothea.**

Prerequisite: German 2b or four years of high school German.

40. Elementary Conversation.* **1 credit.**

The work consists of class discussion in German of simple topics based on reading or illustrative material.

Prerequisite: German 2b or equivalent.

Latin

1. Elementary Latin.* **5 credits.**

(Not offered in 1931-32.)

The object of the course is to present the fundamentals of Latin with special emphasis on the relationship of English to Latin. As far as possible the work of the course not only prepares students for further study of the Latin language and literature, but gives to those who expect to study law, medicine, or other sciences, a better understanding of the terminology of those subjects.

2. Caesar.* **5 credits.**

(Not offered in 1931-32.)

The course in Caesar is the equivalent of the second year of high school Latin. It consists of readings from Caesar's **De Bella Gallico** with exercises in composition at least once a week.

Prerequisite: Latin 1 or one year of high school Latin.

Spanish

1a. First Semester Spanish.* **4 credits.**

Spanish 1a includes careful training in pronunciation, much oral and aural practice, a study of the fundamentals of grammar, and the acquisition of a vocabulary of at least 500 words used in the oral work and reading and checked with the Spanish word and idiom lists. The reading of simple Spanish is started early in the semester. In addition, students are required to do outside reading in English on the history, life, and customs of the Spanish and Latin-American peoples.

1b. Second Semester Spanish.* **4 credits.**

Spanish 1b continues the practice in pronunciation and oral work, the study of grammar, and the acquisition of basic vocabulary and idioms. The reading of Spanish in class is supplemented by easy readings in the foreign language outside of class.

Prerequisite: Spanish 1a or one year of high school Spanish.

10a. Third Semester Spanish.* **3 credits.**

Spanish 10a continues the study of the Spanish people through the reading of a number of novels, short stories, and plays by the best modern authors. Oral and written work is based on the reading. There is a review of grammar with additional finer points in syntax; also a further study of vocabulary and idioms.

Prerequisite: Spanish 1b or two years of high school Spanish.

10b. Fourth Semester Spanish.* **3 credits.**

Spanish 10b is a continuation of the work of Course 10a with an increase in the amount and degree of difficulty of reading. More extensive oral and written reproduction of content in Spanish is required.

Prerequisite: Spanish 10a or three years of high school Spanish.

20a. Elementary Conversation and Composition.* **2 credits.**

(Not offered in 1931-32.)

This is a supplementary course to be taken with Spanish 10a and 10b. It is not open to students who have had the equivalent of two years of college Spanish, except by special permission.

Prerequisite: Spanish 1b or equivalent. Not open to students who have had 10b.

20b. Elementary Conversation and Composition.* **2 credits.**

(Not offered in 1931-32.)

This is a continuation of Course 20a. It is open to properly qualified new students.

Prerequisite: Spanish 20a.

21a. Elementary Survey.* **3 credits.**

Spanish 21 comprises a brief study of the history and the development of all types of Spanish literature—the epic, the drama, prose writings, lyrics, the novel—covering the centuries from 1140 to the present. This study is centered around and illustrated by the reading and interpretation of representative works of each type.

Prerequisite: Spanish 10b or equivalent.

21b. Elementary Survey.* **3 credits.**

This is a continuation of Course 21a. It is open to properly qualified new students.

MATHEMATICS AND ASTRONOMY

1. College Algebra.* **4 credits.**

College Algebra is strongly recommended for all students in commerce and may be offered as an elective in any four year course in the College of Letters and Science.

The following subjects will be taken up: logarithms; simultaneous, linear, and quadratic equations; binomial theorem; progressions; compound interest; probabilities.

Students who have had two years of algebra in high school are not permitted to take this course for credit.

Prerequisite: One year of high school algebra or its equivalent.

2. Trigonometry and Analytic Geometry.* **4 credits.**

This course is a combination of what was formerly Mathematics 2 and Mathematics 4. The following subjects are discussed: trigonometric functions; identities; logarithms; solution of right and oblique triangles; systems of coordinates; transformations of coordinates; the straight line; conic sections, and special curves. This course completes the student's preparation for Calculus.

Prerequisite: One and one-half units of high school algebra or college algebra.

3. Analytic Geometry.* **3 credits.**

Analytic geometry is prerequisite or co-requisite for calculus for Letters and Science Students.

The following subjects are discussed: Cartesian coordinates; polar coordinates; transformation of coordinates; the straight line, conic sections; tangents and normals; the general equation of the second degree; transcendental and parametric equations.

Prerequisite: Mathematics 2 or trigonometry in high school. Students may take this course simultaneously with Mathematics 5a.

5a. Differential Calculus.* **3 credits.**

Students who intend to major in mathematics or science are advised to take this course, together with Course 5b, in the sophomore year. It corresponds roughly to Mathematics 54, 4 credits, offered primarily for engineering students but is open to others.

Prerequisite (or co-requisite): Mathematics 3 or 4.

5b. Integral Calculus.* **3 credits.**

Prerequisite: Mathematics 5a.

6. Determinants and Analytic Geometry of Three Dimensions.* **3 credits.**

All undergraduate majors in mathematics are required to take this course. Content of course: systems of coordinates; the equation of a surface; projections; direction cosines; change of axes; the plane; the straight line; the sphere; the cone; conicoids; axes; generating lines; the general equation of the second degree.

Prerequisite: Mathematics 4.

7. Theory of Investment.* **4 credits.**

Students in the Commerce Course are required to take this course. The following subjects are taken up: interest annuities, amortization, bonds, sinking funds, depreciation, and building and loan associations.

Prerequisite: Mathematics 1 or 51.

112. Differential Equations.* **3 credits.**

This course provides a thorough introduction to the study of the solution of ordinary and partial differential equations. Special attention is paid to the applications of differential equations occurring in engineering, physics, and geometry.

Prerequisite: Calculus.

117. Vector Analysis.* **3 credits.**

This course is an introduction to the study of vectors and vector functions with special applications in the fields of geometry, physics, and mechanics. Some of the subjects taken up are: the algebra of vectors including vector and scalar products; differentiation of vectors and vector differential operators.

Prerequisite: Calculus.

125. Theory of Equations.* **3 credits.**

Some of the subjects taken up in this course are: complex numbers, elementary theorems on the roots of an equation, cubic and quartic equations, Sturm's method, Herner's method, Newton's method, and systems of linear equations.

Prerequisite: Consent of instructor.

Astronomy

1. General Astronomy.* **3 credits.**

To give the student an understanding of the problems which concern the astronomer and of the methods by which he attacks these problems is the object of this course. Attention is paid both to the history of the science and to its modern developments. Mathematics is not required for this course. One night each week, if the sky is clear, is devoted to observation.

Not open to first semester freshmen.

6. Navigation.* **2 credits.**

This course is designed for students who wish an elementary course in Practical Astronomy or who wish to become familiar with the methods by which the position of a ship at sea is determined. Some of the subjects taken up are: instruments used in navigation; latitude by Polaris; latitude by a meridian altitude of the sun; azimuth; longitude by a time sight of the sun or a star; the method of Marc St. Hilaire; the line of position.

Prerequisite: Trigonometry.

PHYSICS

1a. General Physics.* **5 credits.**

Three hours lecture-recitation; one hour quiz; four hours laboratory. Lab. fee, $7.

The following subjects are treated: mechanics, heat, magnetism, and static electricity. The course is open to any Letters and Science student.

1b. General Physics.* **5 credits.**

Three hours lecture-recitation; one hour quiz; four hours laboratory. Lab. fee, $7.

The following subjects are treated: current electricity, sound, and light. Students entering the second semester who have had high school physics may take this course with the consent of the chairman of the department.

PHYSIOLOGY

See page 75

PSYCHOLOGY

1. Introductory Psychology.* **2 or 3 credits.**

This course offers a survey of the basic principles of mental behavior, with a view to understanding mental processes and the mechanisms of character formation. The subject is approached through an examination into the original equipment of the child, and the study of individual differences as determined by heredity and environment. Stress is laid upon the development of habit, and the influence of the emotions. Some of the special topics

covered are: the psychology of learning, memory, imagination, thinking, sensation; special talents and defects; "instinct" and motivation; personality types. Brief attention is given also to such topics as will, intuition, peculiarities of behavior, the cause of worry, mental conflict, and deviations from the normal.

Prerequisite: Sophomore standing.

SOCIOLOGY

1. Sociology.* **3 credits.**

This is an introductory course to the study of sociology and required of students majoring in sociology. The course deals with the environmental, racial, and psychological foundations of society, and a study of the fundamental social institutions and how these institutions adapt themselves to the demands of changing conditions of life and living. The lectures, readings, and discussions are planned to make clear the nature of the organization of our social structure and the means by which the members of society are controlled and directed.

Prerequisite: Sophomore standing.

2. Sociology.* **3 credits.**

Course 2 completes the one-year introductory course to the study of sociology. It deals with the nature of social change and the problems of social adjustment; problems of population; eugenics, race relations; problems of the family; changing status of women and children; social hazards of industrial life; group conflict; war; dependency and correction; problems of socialization. The lectures, readings, and discussions are planned to reveal how the social order is constantly changing and the direction in which sound adjustments are trending.

Prerequisite: Sociology 1 or consent of instructor.

SPEECH

1. Fundamentals of Speech.* **3 credits.**

The recitation hours are devoted to practice speaking before the class, the analysis of individual difficulties, and suggestions for improvement. The lecture hour is planned to give the student an understanding of the speech function.

Prerequisite: Sophomore standing.

3. Argumentation and Debate.* **3 credits.**

The problems involved in gathering material and constructing the type of composition which aims to persuade or to convince are considered in this course. Various types of persuasive speeches are prepared and delivered.

Prerequisite: Speech 1, 7, or 8.

7. Public Speaking.* **2 credits.**

This is a practical course to help business and professional men and women in their speaking, both in public and in private. A maximum of platform work is required of each student. The theory offered is applied, immediately, to actual speaking situations. The course is designed to teach the individual to prepare and deliver speeches creditably.

Prerequisite: Sophomore standing.

8. Extempore Speaking.* **2 credits.**

This course is similar to Speech 7, but it is open only to engineering students.

9. Parliamentary Practice.* **2 credits.**

The purpose of this course is to give a working knowledge of parliamentary practice. A careful study is made of rules of procedure. A maximum amount of actual practice in conducting meetings is made available. Satisfactory completion of the course should enable the student to preside over, or take an intelligent part in, any organized meeting.

Prerequisite: Sophomore standing.

For other courses in Public Speaking, see page 40.

ZOOLOGY

See page 76.

LIBERAL EDUCATION

For time, fee, and instructor, consult schedule which will be issued each semester.

Applications of Engineering in Everyday Life.

The applications of science, mechanics, and electricity play an important part in the life of everyone. Consequently there is a widespread interest in a general and popular presentation of the fundamental principles involved in these modern developments, and in a bird's-eye view of what goes on behind the scenes.

This series of lectures presents in popular and semi-technical language, assisted by demonstrations, slides, and moving pictures, as the occasion requires, the most interesting and outstanding applications of science and engineering to the affairs of everyday life.

The sixteen lectures are selected from the following list of subjects: the production, generation, and distribution of electrical energy; the modern automobile; aeronautics; radio communication; our telephones and telegraphs; the modern railway system; modern systems of municipal water supply; the sanitation of a modern city; building, maintaining, and operating a system of roads and highways; protecting a modern city from fire; transportation by water; the heating, ventilating, and refrigerating of modern buildings; the construction of the modern building; modern materials of construction; fuels and sources of energy; hydro-electric development in Wisconsin; chemistry and modern life; mines and mining; modern science and the weather.

Attractive and Appropriate Clothing.

The homemaker, the business woman, the teacher, or the student will find in this course material which should be of value to her in selecting new clothes or in remodeling old ones. A study is made of attractive clothes and accessories for various occasions.

The height, weight, coloring, and personality of each member of the class will be given special consideration, and the proper lines, colors, and designs suggested for her.

The class will be taught how a woman should apportion the money she has to spend for clothes so that she may appear as attractive as possible.

Biographies of the Gods

This course attempts to interpret the daring and persistent faith of man that the universe in its deepest meaning is on the side of his hopes and ideals. It traces the birth, growth, and passing of the gods in the social history of man. The life stories of the greatest of the gods of the world are surveyed in the light of the trials, triumphs, and tragedies of their peoples on the stage of time. In every case time is taken to indicate what happens to the gods in the hands of the philosophers. After the survey of the many ideas of God in religious history and the ceaseless change in the concept, the course concludes with a statement of the status of idea in the modern world.

Development of the Fine Arts in America. (14 meetings)

The course comprises lectures on the following topics: early art: English, Georgian, and Spanish Mission influences; colonial architecture; colonial portraiture; the beginning of landscape painting: Duesseldorf and Barbizon influences; painting, sculpture, and architecture in 1893; the schools of realism; American impressionism; Homer, Innes, Whistler, and Sargent; important marine, winter, and nocturne painters; important mural painters; the new national and domestic architecture; our achievements in sculpture; and great city buildings.

Home Planning and Decorating.

The buyer of a ready built home, the planner of a new home, or the renter of a home or an apartment is helped by this course to avoid some of the undesirable features that take from the comfort and convenience of home life. The course includes a study of furniture selection, buying and values, how to arrange furniture according to a plan, how to make use of textiles in home furnishing, how to go about selecting carpets and rugs, how to work out a color plan, and how to achieve inviting, cozy homes with an economical expenditure of money.

Home Planning and Decorating. (Advanced Course.)

This is a continuation of the elementary course in Home Planning and Decorating. Among the furishings of the home which are studied with the end in view of selection and use are: china, silver, linen, flowers in and around the home, plants, carpeting, pictures, and lamps. Many of the meetings are held in various stores and decorative establishments with the cooperation of persons who are authorities in their fields.

Goethe. His Life; His Works; His Ideas; His Influence.

This course, to be given during the second semester of 1931-32, is planned to help commemorate in the city of Milwaukee the One Hundredth Anniversary of the death of Goethe on March 22, 1832. The lectures and discussions cover: (a) the more significant aspects of the poet's biography, (b) interpretations of the more perennial of his works, especially the great lyrics, dramas, and novels, (c) a study of the poet as thinker, that is, of the dominant principles of his philosophy of human life and of the world, (d) an attempt to estimate Goethe's influence and present position in his own land and in the modern world at large, more particularly in England and America.

Man and Science.

This course is designed for men and women who desire an intelligent layman's understanding of contemporary science. It is a non-technical, non-laboratory survey of significant aspects of present day thought and knowledge in astronomy, the make-up of matter, structural and historical geology, the evolution of species, anthropology, the laws of heredity, and psychology.

The work of the course consists of stimulating lectures and discussion. The material is specially prepared by outstanding scientists for the scientifically uninitiated. Covering as much ground as it does, the course does not pretend to consider the various sciences exhaustibly; its purpose is to bring to the student a sufficient grasp of the facts and methods of science, to give him an intelligent understanding of what science has done and is trying to do. The course is so planned that it may help those who study it to orient themselves in a world in which science and scientific method are increasingly important in all phases of life. It is, in effect, a synthesis of what science has to reveal about the nature and history of man and the world in which he lives.

No previous work in science is required as a prerequisite.

Masterpieces of Italian Literature in English Translations

This course consists of lectures and discussions based on the reading of such representative works as Dante, The Divine Comedy; Boccaccio, Selected Tales; Cellini, Autobiography; Petrarch, Rime; Castiglione, The Courtier; Machiavelli, The Prince; Manzoni, The Betrothed Couple; and if time permits, selected works from contemporary Italian writers. The lectures include material from the history of Italy necessary to furnish an understanding of the literary background.

Modern Writers and Their Works

This is an informal survey of contemporary English and American literature with reference to significant current European writers whose works are available in popular English translations. The bulk of the course is in the field of the novel. It deals with masters of fiction, their biographical and social backgrounds, their methods, and the novels they write. There are discussions of modern trends in realism and romanticism, the purpose or thesis novel, historical fiction, the psychological and scientific approach, detective or mystery story writing. Such novelists as have written drama form a transition to the field of contemporary drama and its trends as represented by the chief significant writers for the stage. By means of class discussion and lectures, it is hoped that readers of current fiction and drama will be able better to clarify their ideas and estimates of current writers as they appear in the passing show of literature in the making.

Present Trends in the Life of Nations

Soviet Russia and communistic experiments in social and economic reform, Fascism and its influence in Europe, attempts toward international peace, and world labor movements are among the questions of immediate interest to be discussed in this course. It is designed primarily to present the readjustment of the nations of the world to the political, economic, and social revolution following the world war. The lectures deal not only with a survey of present day conditions within individual nations, but with an analysis of the present international situation. Besides communism and Fascism, such subjects as modern economic imperialism, commercial rivalry and

expansion, the advance of democracy in central Europe, humanitarian and social progress, European and American nationalism, and the general interrelationship of the world powers are considered.

Psychology of Human Behavior

This course covers the field of psychology as applied to the understanding and control of human nature, and is designed to meet the interests of the practical layman. The subject matter falls under three general headings: the psychology of personality, the psychology of efficiency, and a treatment of special phenomena and aspects of the mental life. Among the topics covered are: the foundations of character and personality in childhood; the psychology of adolescence, and problems of sex, religion, and vocational adjustment; the nature and effect of strong emotions; the influence of glands on personality traits; efficiency in study, work, rest, and sleep; the mastery of nervousness; the forms and causes of mental abnormality; examination of such phenomena and concepts as hypnotism, faith-cures, the subconscious mind, complexes, the psychology of feeble-mindedness, crime, delinquency of mobs, war, radicalism, belief, persuasion.

Recent German Literature.

This course consists of twelve lectures on twentieth century German and Austrian novelists and dramatists. While each lecture deals with only one or two writers, a more extensive list of names will be found in the bibliography, copies of which will be distributed to the members of the class. The course will be conducted in the German language.

Russian (Elementary)

The course aims to give the student a thorough training in pronunciation, accompanied by practice in speaking and writing. It is designed for persons desiring to acquire a rudimentary reading and speaking knowledge of the language.

TECHNICAL INSTITUTE COURSES

As a result of an extensive investigation of Engineering and Technical Education in Europe, the United States, and Canada, conducted by the Society for the Promotion of Engineering Education, American educators and industrialists have become aware of the fact that a type of educational facility highly developed and successful in Europe—the Technical Institute—is lacking in the American educational plan. The Technical Institutes of Europe are described as follows by Mr. W. E. Wickenden, formerly Director of Investigation for the Society for the Promotion of Engineering Education and now President of the Case School of Applied Science:

> "Through great diversity of name, organization, and program runs a common warp of distinctive characteristics; they are not trade schools, nor are they preparatory schools for higher studies; their courses are of terminal character and are intended for young men already oriented to industry, who wish intensive preparation for definite lines of advancement; most of the students are not bookminded; direct processes of teaching and learning are employed, and most of the student's work is done on the premises. The entire process is pointed to the higher practical pursuits of industry, rather than to its highly intellectual functions. In addition to engineering courses of a fairly general, though practical character, these schools provide nearly all the higher training in the technology of specific industries and training for particular technical functions."

It has long been recognized that there is a need in Wisconsin, especially in the Milwaukee industrial area, for an educational activity of the same general character as that of the Technical Institute, which trains young men for the semiprofessional fields which exist between the skilled craftsman and the trained professional engineer. Because of this need the University Extension Division of the University of Wisconsin is now offering at its Milwaukee Center several full day educational programs for those properly qualified young men who desire to enter one of the semiprofessional fields and thus spend less than the usual four-year period in academic training. The general idea of these educational programs, although patterned after the plan of the technical institutes, has been modified to meet existing conditions in Wisconsin and the United States.

At the present time there are available to young men a two-year full day program in **Building Design and Construction** and a seventeen-week full day program in **Radio Communication.** In September, 1932, a two-year full day program in **Mechanical and Industrial Technology** will be offered.

The prerequisite for entrance to these courses is high school graduation or its substantial equivalent. The requirements of the courses will be exacting and strenuous. Each applicant for admission will be judged solely on his ability to carry the work and to profit by it.

The method of instruction employed differs somewhat from the conventional method. Each student may start his course at a point in the work where his ability and previous training permit. It is possible for him to work as slowly or as rapidly as he desires. Another feature of these courses is that

the student is expected to do all of his work during the regular day periods under the supervision of the instructors. The instruction will be substantially of a collegiate grade and will be under the direction and supervision of properly qualified teachers who are also mature and experienced in the engineering and technical fields.

The technical institute type of courses offered in Milwaukee aims to train young men for the so-called semiprofessions, those vast fields of activity between the skilled craftsmen and the trained professional engineers.

Entrance Requirements

Admission will not be based upon the number of years' attendance at school but upon evidence of the prospective student's ability to carry the work required in the course he is seeking to enter. The determination of these abilities will be in charge of the Bureau of Guidance and Counselling. In view of the fact that the instruction will be on a college level, the student is expected to have a high school education or its equivalent in practical experience, general information, and attainment.

The Bureau of Guidance and Counselling will hold a series of conferences with prospective students in order to determine their fitness to enter these courses. As a result of these conferences the student may expect his preparation and fitness to enter the course to be evaluated. He will be advised and will be expected to follow the procedure given below:

1. If he is equipped with more general knowledge, information, and skill than necessary for entrance, it will be possible for him to complete the course within a period less than that assigned.
2. If he meets the requirements, he may expect to complete the full course in the time allowed.
3. If he shows evidence of sufficient ability and previous training to profit by the course but lacks certain essential requirements, he will be expected to make up the deficiencies. This will usually require a longer period.
4. If he shows that his previous training and ability do not fit him for the particular course he wishes to enter, he may profit by following another line which will be suggested in conference.

A student should not hesitate to submit himself to these conferences because it is his purpose and the purpose of the institution to ascertain where his abilities and capacities lie, without reference to his previous school training.

Fees

The regular Extension fee of $5.00 per credit hour will be charged. Fifteen hours is usually a full course. Laboratory fees are in addition to this amount, depending upon the course.

Certificates

University of Wisconsin Extension Division certificates will be issued to those who have successfully completed a course of study in the Technical Institute. These certificates will be recognized in business and industry and by the public at large as standing for a very definite attainment.

TWO-YEAR DAY COURSE IN BUILDING DESIGN AND CONSTRUCTION

This specialized, intensive, two-year course gives training for positions connected with the design and construction of buildings. It is of particular interest to men who wish to become building inspectors, construction superintendents, structural or architectural draftsmen, or structural designers. The training given in this course will qualify the student for positions of substantial responsibility after a little practical experience. This is especially true if the student secures part-time employment along constructive lines while attending school. This experience will be of great value to him not only in securing a position after completing the course but also in getting a better understanding of the application of theory to practice.

LIST OF STUDIES

First Year

First Semester		Second Semester	
Mathematics 51 or 403M	5 rec.	Structural Theory 412M	6 rec.
Structural Theory 402M	5 rec.	Surveying 410M	3 rec.
Drawing 405M	6 lab.	Structural Drafting and Steel Handbook 413M	9 lab.
Concrete Work 407M	4 lab.	Matls. of Const. 415M	2 rec.

Second Year

Reinf. Concrete 420M	2 rec. 4 lab.	Reinf. Concrete 430M	9 lab.
Steel Buildings 421M	2 rec. 4 lab.	Contr. and Specif. 431M	1 rec.
Estimating 422M	2 rec.	Special Problems 434M	2 lab.
Foundations 423M	2 rec.	Roof Truss Design 432M	6 lab.
Stresses in Trusses 424M	3 lab.	Reports by Students	1 rec.
Construction Plant 425M	1 lab.	Inspection Trips 438M	1 lab.

DESCRIPTION OF COURSES

407M. Concrete Work. This is not a design course but comprises the development of scale working drawings of a concrete building, together with the treatment of excavations; placing concrete; placing steel; amount of materials per cubic yard of concrete; mixing; amount and size of lumber for form work; placing of forms; and many other topics.

425M. Construction Plant. Various problems regarding the size and location of the plant are discussed in the class. The class is taken to see plants in operation on various kinds of construction work.

431M. Contracts and Specifications. This subject covers the elementary principles of contracts and gives the student practice both in interpreting and writing specifications.

405M. Drawing. This subject covers the underlying principles of perspective, isometric, and orthographic projections, with illustrative problems and simple construction drawings. Students are required to work both on paper and tracing cloth.

422M. Estimating. Topics treated: the preparation of a quantity survey, covering such items as enter into the construction of a building; namely, concrete, brick, steel, and lumber. From practical problems, the students are required to make quantitative estimates covering the various branches of construction and to list the results in such a manner as to facilitate making a cost analysis.

423M. Foundations. The following are a few of the subjects treated: soil investigations; tests to determine soil conditions; bearing power of soils; excavations; general considerations; preliminary investigations; distribution of pressure; spread footings; timber; and concrete piles.

438M. Inspection Trips. The class is taken out from time to time to visit construction work of special interest. The student makes a written report on each trip.

415M. Materials of Construction. This is a short course giving the student the fundamentals regarding the production and manufacture of the ordinary materials used in construction.

51. Elementary Mathematical Analysis. This course is required of all freshmen in engineering. Applicants for admission will be required to pass an examination in algebra, given shortly after the opening of the semester. This course includes: functions, rectangular coordinates and the straight line; the power function; the circle and the circular functions; ellipse; hyperbola; single and simultaneous equations; permutations and combinations; binomial theorem; progressions. A thorough review is given at the close. The course gives prominence to the fundamental truths of elementary analysis. Graphing is emphasized.

Students who pass the regular examination given to all freshmen engineers are admitted to Mathematics 51. Students who do not pass the examination will be required to take Mathematics 403M.

403M. Mathematics. This is a special course planned to meet the needs of students who are not prepared to enter Mathematics 51 and includes both algebra and trigonometry. The following topics are treated: Algebra; addition, subtraction, multiplication, and division; special products and factors; equations; fractions, formulas; equations with more than one unknown; exponents, powers, and roots; and quadratic equations. Trigonometry: Logarithms; angles, trigonometric functions; tables; right triangles; and oblique triangles.

420M. Reinforced Concrete. This course teaches the fundamentals regarding the design of reinforced concrete beams, slabs, and columns. The following are some of the topics treated: steel and concrete in combination; rectangular beams; web reinforcement; slabs; T-beams; beams with steel top and bottom; and columns.

430M. Reinforced Concrete. This subject is an application of the theory of the first semester's work in reinforced concrete. The student works out designs involving floors of various types, a roof panel, columns, various types of footings, and both gravity and reinforced retaining walls. Detail drawings are required.

Reports by Students. Two or more topics are assigned to each student during the semester. The topics are on various engineering subjects. Talks are prepared on the assigned subjects and presented before the class.

432M. Roof Truss Design. The complete design of two roof trusses is required, one of timber and the other of steel. Detail drawings are required.

434M. Special Problems. This subject includes work on stress-computations for trusses supported by columns, deflection in beams, some work on the deflection of trusses, wind bracing, and continuous beams.

421M. Steel Buildings. Many practical considerations in connection with the design of buildings are considered. Numerous designs are required with detail drawings. Floor designs with special attention to the economical arrangements of beams and girders are worked out.

424M. Stresses in Trusses. Stresses in different types of trusses due to various loadings are worked out by the student. Both the algebraic and graphic methods are used.

413M. Structural Drafting and Steel Handbook. The student starts with simple structural details which gradually become more complicated. The work conforms to standard drafting room practice. Tracings of some of the plates are required. The Carnegie Pocket Companion is used in connection with the work of this course.

402M. Structural Theory. This subject is a preparation for Structural Theory 412M given the second semester. Some of the topics treated are: forces; tension; compression; shear; unit stresses; rivets; modulus of elasticity; reactions; center of gravity; moment of inertia. The Carnegie Pocket Companion is used in connection with the text. The use of the slide rule is also given, and the student is required to use it in solving the various problems.

412M. Structural Theory. The following are some of the topics treated: concurrent and non-concurrent forces; space and force diagrams; compo-

sition and resolution of forces; reactions; use of algebraic and graphical methods; shears and moments in beams; design of simple beams.

410M. Surveying.

Lab. fee, $2.25.

The first half of the semester is devoted to classroom work and the second half to outside problems. The student learns the use of the tape, level, and transit. After completing this course he should be able to run ordinary levels, give grade for construction, stake out building foundations, and estimate quantity of earthwork.

COURSES IN RADIO COMMUNICATION

Present day trends indicate the demands for men trained in the theoretical and practical applications of the principles of radio communication. In every branch of work in the radio field the trained man is the one who is in the foreground. No man can hope to attain a position of responsibility in the radio field without a training in the technical aspects of radio.

These courses have grown out of auxiliary courses given during the past six years and are planned as a definite preparation for the actual problems met in practice. They are designed to give an understanding of the fundamentals underlying radio communication.

The Radio Operator's Course

The Radio Operator's Course, consisting of lectures on theory, laboratory practice, and code drills covers the larger part of the requirements for the United States government examination for a Second Class Commercial Operator's License. Arrangements may be made whereby those finishing this course satisfactorily may complete the remainder of the requirements of advanced transmitting, speed, and technique in code at any radio school in the middle west accredited by the United States Department of Commerce. The time necessary to do this is from eight to twelve weeks, depending upon the ability of the student.

The holders of Second Class Operator's Licenses are eligible to work in any broadcasting station or on any ship as prescribed by government regulations. Many enter the movie-sound field and also the laboratories of manufacturers. Both of these offer attractive opportunities because of the rapid rise of these industries. Many positions are open for the trained man.

The course is covered in seventeen weeks with classes every day, except Saturday, from 8:00 to 12:00 a. m. and from 1:30 to 4:30 p. m.

The Technician's Radio Service Course

The Technician's Radio Service Course consists of lectures and laboratory practice particularly pertaining to the needs of a service man and is completed in Milwaukee in one semester of seventeen weeks.

List of Studies

The course in Radio Communication comprises lectures, laboratory experiments, and classroom work divided into ten parts and taken as a unit in a full time, all day, session completed in one semester.

Elements of Electricity 275M
Radio Circuits 276M
Vacuum Tubes 277M
Receiving Sets and Apparatus 278M
Transmitting Circuits and Equipment 279M
Laboratory Experiments 280M
Code 281M
Design 282M
Technical English 283M
Technical Mathematics 284M

DESCRIPTION OF COURSES

275M. Elements of Electricity.

This covers magnetism, electrostatics, direct currents and alternating currents, including Ohm's law, resistance, inductance, capacity, frequency, reactance, impedance, phase relations, resonance and vectors, motors and generators.

276M. Radio Circuits.

The function of the various parts of the receiver is covered in this section which includes series and parallel resonance, coupling of circuits, filters, audio and radio amplification, types of control, and bridge circuits.

277M. Vacuum Tubes.

This section includes the electron theory, amplifier action, detector action, oscillators, regeneration, curves and special tubes such as the photoelectric cell, the neon tube, pentode, and the thyratron.

278M. Receiving Sets and Apparatus.

The various types of receiving sets and associated apparatus are included: loud speakers, power supply, phonograph combinations, amplifiers, and public address systems.

279M. Transmitting Circuits and Equipment.

This section covers the principles involved in the transmission of signals by radio and includes the various oscillator circuits, tuning, antennae, wave propagation, power supply, microphones, and modulation.

280M. Laboratory Experiments.

The experiments follow the topics covered in the lectures, but opportunity is given for individual work. The practical application of all principles is stressed by the measurement of resistance, inductance, and capacity; the making of characteristic curves of vacuum tubes; wavemeter calibration; series and parallel resonance; the tuning of transmitting circuits; and service tests on receivers.

281M. Code.

The International Morse Code is taught by actual practice in sending and receiving together with the "Q" signals and regulations pertaining to the handling of traffic.

282M. Design.

This covers in some degree the actual design and layout of a wavemeter, power transformer, filter system; the types of motors and generators; circuit tracing and lay-out of receivers and transmitters.

283M. Technical English.

The essentials of English pertaining to the engineer's use are covered in this part of the course. It includes the writing of reports on experiments, investigations, or outside reading.

284M. Technical Mathematics.

Only the essential phases of mathematics pertaining to use in radio communication are covered. These include algebra, trigonometry, vector diagrams, logarithms, the slide rule, and exponents.

PROPOSED TWO-YEAR DAY COURSE

in

"MECHANICAL AND INDUSTRIAL TECHNOLOGY"

(To be offered beginning September, 1932)

Recent surveys of the industrial field indicate that industry has need for and can normally absorb approximately three times as many semiprofessionally trained men in the mechanical field as four-year engineering graduates. The proposed two-year course in Mechanical and Industrial Technology is planned to offer semiprofessional training to young men in industry who desire to advance and to fill important positions in the mechanical and industrial field.

Tenative Schedule of Subjects

First Year

First Semester	Second Semester
English	English
Mathematics	Mathematics
Drawing	Chemistry
Mechanics and Physics	Mechanics and Physics
Shop and Manufacturing Methods	Shop and Manufacturing Methods
General Engineering	General Engineering

Second Year

First Semester	Second Semester
American Civilization	American Civilization
Heat Power	Machine Design
Materials of Construction	Economics
Electricity	Electricity
Shop and Manufacturing Methods	Surveying
General Engineering	Shop and Manufacturing Methods
	General Engineering

(The above outline is tentative and subject to revision.)

COURSES TO FIT INDIVIDUAL NEEDS

In addition to the courses of the Technical Institute, it is possible by conferences with the members of the Guidance Bureau to arrange special combination courses to suit individual needs. These special courses can be made up from the four other fields offered in the Milwaukee Center—Business, Letters and Science, Engineering, and Liberal Education.

PART-TIME FACULTY, 1930-31

Abendroth, E. A., B.S., Instructor in Structural Engineering
Abendroth, George, B.S., Instructor in Civil Engineering
Book, James A., B.S., C.P.A., Instructor in Accounting
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Ellingwood, R. E., M.S., Assistant Professor of Business Administration
Ellwood, Mrs. V., Instructor in Home Economics
English, H. R., M.A., Associate Professor of Business Administration
Ernst, A. B., Ph.D., Associate Professor of German
Ericson, Henry, B.A., B.S., Instructor in Mathematics
Fellows, D. R., M.A., Associate Professor of Business Administration
Gould, L. T., B.A., Instructor in Geography
Hanel, Alexander, Instructor in Shop
Held, Edgar, Instructor in Shop
Hinman, A. G., M.A., Lecturer in Real Estate
Holmes, C. A., Instructor in Salesmanship
Husband, R. W., Ph.D., Assistant Professor of Psychology
Jacobsen, J. C., Instructor in Federal Income Tax
Jenkins, Floyd E., B.A., LL.B., Instructor in Business Law
Kneisel, Fred E., Instructor in Shop
Lapp, John A., LL.D., Lecturer in Sociology
Lyon, A. E., Ph.D., Assistant Professor of Spanish Drama
Maurer, Edward R., B.C.E., Professor of Mechanics
Mellencamp, F. J., Ph.D., Lecturer in Mathematics
Merry, W. H., B.S., Instructor in Metallurgy
Michelson, Gustave G., Instructor in Shop
Oestreich, Carl, B.S., Instructor in Structural Engineering
Olson, J. E., B.L., Emeritus Professor of Scandinavian Drama
Ortega, J., M.A., Professor of Spanish Drama
Otto, Max, Ph.D., Professor of Philosophy
Phillipson, Paul H., Ph.D., Instructor in German
Read, James, B.A., LL.B., Lecturer in Real Estate
Rilling, Walter E., B.A., Instructor in Accounting
Rockwell, Ethel, B.A., Assistant Professor of Speech
Rusch, Milton H., Lecturer in Music Appreciation
Russo, J. L., Ph.D., Associate Professor of Italian Drama
Schenck, W. J., B.A., C.P.A., Lecturer in Accounting

Schmidt, H. W., B.S., M.E., Instructor in Mechanical Drawing
Schoenig, F. H., Instructor in Shop
Shaeffer, W. A., Ph.B., C.P.A., Instructor in Accounting
Smith, H. A., M.A., Professor of French Drama
Snead, Sam, Instructor in Radio
Snyder, M. F., B.S., Instructor in Accounting
Sobota, Mrs. Mary, B.A., Instructor in Secretarial Training
Spinti, George F., A.I.A., Instructor in Architectural Design
Steuch, Daniel, Instructor in Shop
Straube, B. C., B.A., Instructor in German
Suchy, R. J., M.A., Laboratory Assistant in Physics
Svanoe, H. T., LL.B., Instructor in Business Law
Thom, Theodore, Instructor in Shop
Torgerson, T. L., Ph.M., Lecturer in Education
Troutman, W. C., M.A., Associate Professor of Speech
Veenendaal, Walter, A.I.A., Instructor in Architectural Drawing
Voelker, Alice, Laboratory Assistant in Zoology
Warren, Victor, Laboratory Assistant in Radio
Watson, Dudley Crafts, Lecturer in Art
Watson, K. M., Ph.D., Assistant Professor of Chemical Engineering
Wenninger, John P., M.A., Instructor in German
West, Robert, Ph.D., Professor of Speech Pathology
White, Helen, Ph.D., Assistant Professor of English
Wiepking, C. A., C.E., Instructor in Structural Engineering
Williams, Ralph, Instructor in Drawing
Zentner, Ruth B., B.A., Instructor of Speech Pathology
Zoerb, H. M., B.S., Instructor in Mathematics

CORRESPONDENCE-STUDY COURSES

The Correspondence-Study Courses offered by the University of Wisconsin, from Madison, provide individual instruction adapted to the special needs of each student. These courses, prepared and conducted by members of the University faculty, may be undertaken in the student's leisure hours at his home. Through them the University and the home are brought into close relationship; and through them also everyone in the State is given an opportunity to obtain the highest education possible at the smallest practical expense. They may be grouped as follows:

1. **Regular university studies** which may be taken for credit toward a degree.

2. **Advanced courses** designed to help graduates and others already in professional or practical life to keep in touch with the advancement in science and other fields of knowledge.

3. **High school and preparatory studies** for those for whom residence study is not available or practicable.

4. **Vocational courses** which supply knowledge and training in business, industrial, and professional fields.

5. **Elementary and grammar school studies** for adults who needs such instruction for practical purposes.

6. **Review Courses.**
   Over 400 courses are offered, some of which are listed below:

General	**Business**	**Engineering**
Botany	Accounting	Aeronautics
Chemistry	Advertising	Architectural
Education	Auditing	Automotive
English	Bookkeeping	Chemical
Modern Languages	Bus. Administration	Civil
General Sciences	Bus. Correspondence	Concrete
Geography	Business Law	Drafting
High School Subjects	Cost Accounting	Electrical
History	Economics	Heating and Ventilating
Home Economics	Elements of Money & Banking	Mathematics
Library Methods	Freehand Lettering	Mechanical
Industrial Arts	Income Tax	Railroad
Mathematics	Retail Selling	Structural
Music	Show-Card Writing	Surveying
Pharmacy	Store Management	Telephony
Philosophy		
Sociology		

For detailed information, address:

UNIVERSITY EXTENSION DIVISION
The University of Wisconsin
Lake Shore District Office
623 West State St., Milwaukee, Wis.

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THE

UNIVERSITY EXTENSION CENTER

IN

MILWAUKEE

Business
Engineering
Letters and Science
Liberal Education
Technical Institute
1932-1933

THE UNIVERSITY OF WISCONSIN
UNIVERSITY EXTENSION DIVISION
623 W. State Street Marquette 7051

BULLETIN OF
THE UNIVERSITY OF WISCONSIN

CALENDAR

1932-33

EVENING CLASSES

FIRST SEMESTER

September 12-17 incl.	Monday-Saturday	Registration days
September 19	Monday	Instruction begins
November 11	Friday	Armistice Day; legal holiday
November 24	Thursday	Thanksgiving Day; legal holiday
December 19-January 1 incl.		Christmas recess
January 23-27 incl.	Monday-Friday	Final examinations

SECOND SEMESTER

January 30-February 4 incl.	Monday-Saturday	Registration days
February 6	Monday	Instruction begins
February 22	Wednesday	Washington's birthday; legal holiday
April 9-16, incl.		Spring recess
May 30	Tuesday	Memorial Day; legal holiday
June 5-9 incl.	Monday-Friday	Final examinations

DAY CLASSES

FIRST SEMESTER

September 15, 16	Thursday, Friday, 9-11 a.m.; 2-4 p.m.	Registration days
September 19	Monday	Instruction begins
September 24	Saturday	Special examinations for removal of conditions
November 11	Friday	Armistice Day; legal holiday
November 24-27 incl.		Thanksgiving recess
December 19-January 1 incl.		Christmas recess
January 14	Saturday	Examinations for removal of conditions
January 23-28 incl.	Monday-Saturday	Final examinations

SECOND SEMESTER

February 2, 3	Thursday, Friday, 9-11 a.m.; 2-4 p.m.	Registration days
February 6	Monday	Instruction begins
February 22	Wednesday	Washington's birthday; legal holiday
April 8	Saturday	Examinations for removal of conditions
April 9-16 incl.		Spring recess
May 5, 6	Friday-Saturday	Physics exhibition
May 30	Tuesday	Memorial Day; legal holiday
June 5-10 incl.	Monday-Saturday	Final examinations

THE

UNIVERSITY EXTENSION CENTER

IN

MILWAUKEE

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Engineering
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Liberal Education
Technical Institute
1932-1933

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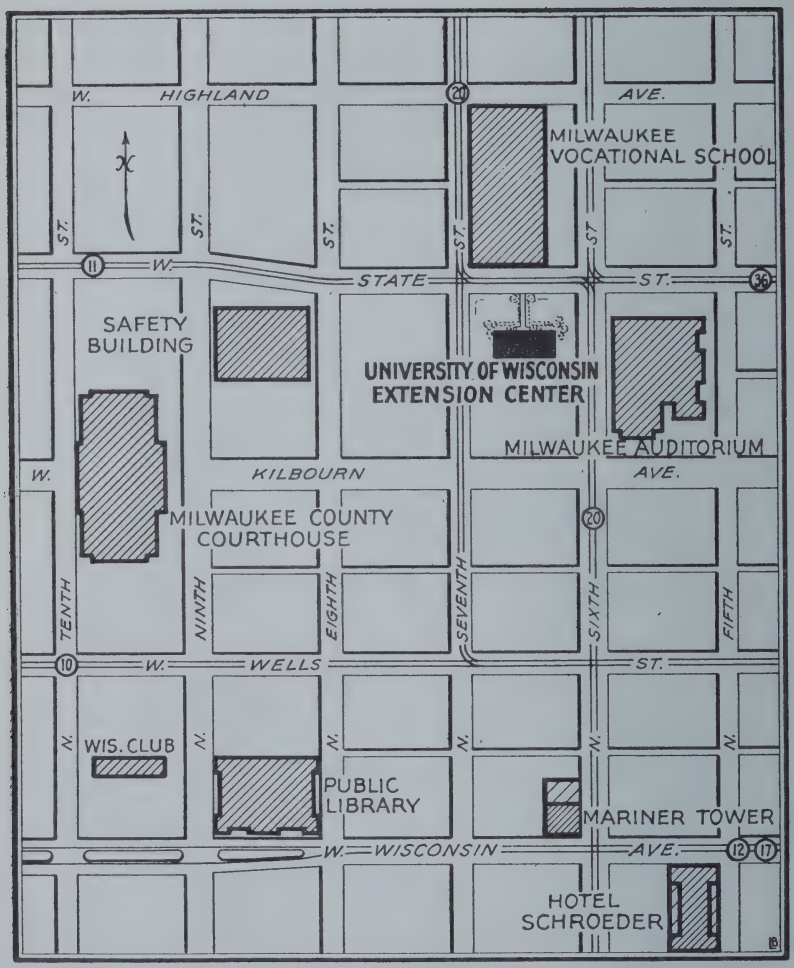

LOCATION OF MILWAUKEE CENTER

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Baier, Joseph, Ph.D., Instructor in Zoology
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Battig, Leon, M.A., Instructor in Mathematics
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[1]On leave, 1932-33.

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Steinfort, Meta M., M.A., Associate Professor of Spanish
Strevey, Tracey E., Ph.D., Assistant Professor of History
Taylor, Carl, M.A., Assistant Professor of Speech
Torinus, Gracia E., M.A., Instructor in English
Town, George G., Ph.D., Associate Professor of Chemistry
Vass, John I., M.A., Instructor in Mathematics
Voigt, Mrs. Frieda, B.A., Instructor in German
Walker, Ruth I., Ph.D., Assistant Professor of Botany
Wesle, Herbert W., B.S., Assistant Professor of Topographic Engineering
Young, Charles E., Ph.D., Professor of Romance Languages

DEPARTMENTS

Business

M. R. Schnaitter, M.A., Associate Professor of Economics, in Charge of Business Courses
H. R. English, M.A., Professor of Business Administration
R. E. Ellingwood, M.S., Assistant Professor of Business Administration
Harry L. Kunze, M.A., C.P.A., Assistant Professor of Accounting, in Charge of Accounting Courses
T. Leroy Martin, B.Ed., M.B.A., C.P.A., Assistant Professor of Accounting
Ferdinand Aumueller, Instructor in Advertising
James A. Book, B.S., C.P.A., Instructor in Accounting
James Browning, M.A., LL.B., Instructor in Accounting
William Doll, B.A., Instructor in Real Estate Law
Phil E. Hayes, Instructor in Real Estate
C. A. Holmes, Instructor in Salesmanship
J. C. Jacobsen, Instructor in Income Tax
Floyd E. Jenkins, B.A., LL.B., Instructor in Business Law
William F. Koch, B.S., Instructor in Insurance
Margaret I. Noltner, Instructor in Secretarial Training
Walter E. Rilling, B.A., Instructor in Accounting
Milo F. Snyder, B.S., Instructor in Accounting

Additional instructors to be appointed.

Engineering

Ben G. Elliott, M.S., M. E., Professor of Mechanical Engineering, Head of Department of Engineering
William J. Fuller, B.A., Professor of Civil and Structural Engineering, in Charge of Engineering Courses
Harry T. Avey, M.E., Assistant Professor of Mechanical Engineering
Leo S. Baldwin, B.A., B.S., Assistant Professor of Drawing; Chairman of Drawing Department
C. D. Case, B.S., Assistant Professor of Mechanical Engineering
C. L. Dean, B.S., Assistant Professor of Mechanical Engineering
Carl Fechheimer, B.S. in E.E., M.E., Special Lecturer in Electrical Engineering
Herbert W. Wesle, B.S., Assistant Professor of Topographic Engineering
E. A. Abendroth, B.S., Instructor in Structural Engineering
George H. Abendroth, B.S., Instructor in Civil Engineering
Carl Oestreich, B.S., Instructor in Civil Engineering
Sam Snead, Instructor in Radio Communication
George F. Spinti, A.I.A., Instructor in Architectural Design
Walter Veenendaal, A.I.A., Instructor in Architectural Drawing

Additional instructors to be appointed.

Letters and Science

Astronomy (See under Mathematics)

Biology

[1]Donald C. Boughton, M.S., Assistant Professor of Zoology, Chairman
Ruth I. Walker, Ph.D., Assistant Professor of Botany, Acting Chairman
Joseph G. Baier, Ph.D., Instructor in Zoology
Benj. H. Schlomovitz, M.S., M.D., Lecturer in Physiology

Chemistry

George G. Town, Ph.D., Associate Professor of Chemistry, Chairman
Paul E. Millington, Ph.D., Assistant Professor of Chemistry
Chauncey C. Hale, M.S., Instructor in Chemistry
Victor A. Reinders, M.A., Instructor in Chemistry
Clair N. Sawyer, M.S., Instructor in Chemistry
Ruben W. Sy, Library Assistant

Economics and Sociology

M. R. Schnaitter, M.A., Associate Professor of Economics, Chairman
Philip Person, Ph.D., Assistant Professor of Sociology
George L. Leffler, Ph.D., Instructor in Economics
John L. Miller, Ph.M., Instructor in Economics

English

Frank M. Hursley, M.A., Assistant Professor of English, Acting Chairman
John J. Creamer, B.A., LL.B., Associate Professor of English
Mary R. Babcock, M.A., Instructor in English
Dudley C. Brooks, M.A., Instructor in English
Elisabeth K. Holmes, B.A., Instructor in English
Gracia E. Torinus, M.A., Instructor in English

Geography

Lucius T. Gould, B.A., Instructor in Geography

German

Charles M. Purin, Ph.D., Professor of German, Chairman
Paul H. Phillipson, Ph.D., Instructor in German
Frieda A. Voigt, B.A., Instructor in German

History

Tracey E. Strevey, Ph.D., Assistant Professor of History, Chairman
Hilmar C. Krueger, Ph.D., Instructor in History

[1]On leave, 1932-33.

Mathematics and Astronomy

George A. Parkinson, Ph.D., Associate Professor of Mathematics and Astronomy, Chairman
Morris Marden, Ph.D., Assistant Professor of Mathematics
William E. Roth, Ph.D., Assistant Professor of Mathematics
Florence L. Axen, M.A., Instructor in Mathematics
Leon Battig, M.A., Instructor in Mathematics
Eugene A. Rasor, M.A., Instructor in Mathematics
John I. Vass, M.A., Instructor in Mathematics

Physics

Miles J. Martin, Ph.D., Associate Professor of Physics, Chairman
Lester T. Earls, M.A., Instructor in Physics
T. Alton Rouse, Ph.D., Instructor in Physics and Mathematics

Psychology

Lewis E. Drake, Ph.D., Assistant Professor of Psychology

Romance Languages

Charles E. Young, Ph.D., Professor of Romance Languages, Chairman
Meta M. Steinfort, M.A., Associate Professor of Spanish
Florence C. Stehn, M.A., Assistant Professor of French

Speech

Carl Taylor, M.A., Assistant Professor of Speech
Aline Schutt, B.A., Assistant in Speech

LIBERAL EDUCATION

In addition to the full-time faculty listed above, some of whom are teaching courses in Liberal Education, the following distinguished lecturers have been invited to give courses in this field:

Curt Baum, Ph.D., Lecturer in German Literature
Harry Bogner, A.I.A., Lecturer in Architecture
Mrs. Vera Ellwood, Lecturer in Home Economics
Alfred G. Pelikan, M.A., Lecturer in Art
Mrs. Margaret Pollitzer, M.A., Lecturer in Education
B. H. Schlomovitz, M.S., M.D., Lecturer in Physiology
Sadie M. Shellow, Ph.D., Lecturer in Psychology
Dudley Crafts Watson, Lecturer in Art

THE UNIVERSITY EXTENSION CENTER IN MILWAUKEE

Over 50 per cent of the people of Wisconsin live in the 20 eastern counties centering around the city of Milwaukee, which comprises only 17 per cent of the territory of the state. Over one-fifth of the people of the state live in Milwaukee county. The University Board of Regents, therefore, decided some twenty years ago that if the Extension Division were to serve effectively this heavily populated section, an extension center would have to be developed in the city of Milwaukee. Rented headquarters were first established in 1908. Through all the years the only program of service developed there has been extension classes. (Other state-wide services of the Extension Division as carried on from central headquarters at Madison are described on page 112.)

After the World War the federal and state government requested the Extension Division to establish in Milwaukee a curriculum of freshman and sophomore courses in Letters and Science, Commerce, and Engineering for returned veterans whose tuition was to be paid by the government. This was done, and the courses became so popular that a number of Milwaukee parents requested the University to allow their sons and daughters, then graduating from high school and unable financially to come to Madison, to take these courses along with the veterans, and receive college credit. Permission was granted, and in 1923 the Board of Regents of the University offered these freshmen and sophomore extension courses to be made available to the graduate of any accredited high school in Wisconsin.

In 1921 the Legislature appointed an interim committee to make a special study of the Milwaukee extension situation, and of the need for a state-owned building. This committee made a printed report of its findings to the 1923 Legislature and recommended an appropriation of $150,000 for an Extension building in Milwaukee, which recommendation was enacted into law in 1925. The 1927 Legislature, after a full hearing by its joint finance committee, voted an additional $175,000 in order to build a building large enough to care for the actual needs. During the 1925 Legislature the State Attorney-General, when requested for a ruling, reported that the University Extension program in Milwaukee and the proposed building were legal and constitutional. From that day to this no policy has been altered that might in any way invalidate this ruling. While in the day classes there has been a normal growth in the number of students taking freshman and sophomore credit courses, in the evening classes the demand is more for the non-credit courses in liberal education and in those business and engineering subjects on a college level which fit one for progress in the industrial world. Only 18.8 per cent of the evening class registrations are for college credit.

One of the reasons why the classes in Milwaukee have been so popular is the fact that they are meeting the need of adults who must work hard for a living while trying to get an education. Milwaukee, being the largest city in Wisconsin, offers a great variety of opportunities for adults to find full or part time employment while taking these courses.

The adult who has already passed the school and college age, who must work and earn his living and in many cases provide at the same time for a

family, cannot carry a full residence program of studies. Colleges make out their schedules and curricula to meet the needs of full-time, relatively young students. The class program at the University Extension Division in Milwaukee, on the other hand, is organized to meet the special requirements of adults who are already in the practical work of life. The Extension Division offers courses in the morning, afternoon, late afternoon, and evening, so that an adult may attend classes at any period when he is not working. Since classes in the Extension building are held from eight o'clock in the morning until nine-thirty at night, or for thirteen and one-half hours a day, it is probably the most efficiently used college classroom building in the country.

The new building was completed during the summer of 1928. It comprises seven stories and contains twenty-five classrooms and lecture halls, six science laboratories (physics, chemistry (2), biology, engineering, and radio), and a spacious library and reading room.

The kind of institution which the University of Wisconsin Extension Division is developing in Milwaukee is one that can organize a program of study to meet the needs of the individual rather than one that forces the individual to follow a regular curriculum. Among those whose needs are given special attention are the following:

The student who must work and earn part or all of his expenses while taking courses.

The individual who wishes to have a special program of studies suggested by faculty advisers to fit his particular needs and abilities.

The adult who wishes to select his own courses without reference to credit toward a degree or the securing of a certificate.

The student who can afford to devote only two years to preparation for a position that requires college training.

The high school graduate who wishes to do his first two years of college work in an institution near home.

The adult who wishes to broaden his education along lines of his own choice for purposes of self-improvement, intelligent citizenship, and general culture.

GENERAL INFORMATION

LOCATION

Classes are held in the University Extension building at 623 W. State Street, opposite the Milwaukee Vocational School and the City Auditorium. The twenty-five classrooms and lecture halls which this building affords, together with its library and six science laboratories, enable the Extension Division to offer a complete program of studies.

OPPORTUNITIES FOR WORK

Since this institution offers morning, afternoon, and evening classes, it is possible for students to arrange to take work for University credit at

General Office

convenient hours. Students expecting to earn their way through college are allowed to carry a reduced program of studies. Milwaukee, being the largest city in Wisconsin, offers a great variety of opportunities for high school graduates to come there from all parts of the State and find part time employment in many large industrial and business concerns.

GUIDANCE AND COUNSELING

The University of Wisconsin Extension Center emphasizes individual attention to students. This work is carried on by the Guidance Bureau. Each student is assigned a counselor as soon as he enters. With his counselor he can discuss his academic and personal problems as they arise, and work out a curriculum that best suits his needs. This is made possible by the varied types of work offered which include courses in Business, Engineering, Letters and Science, Liberal Education, and special courses in the Technical Institute.

REGISTRATION

Registration consists of filling out the necessary blanks provided at the office and **paying in full** for the courses taken. **No one is placed on the class roll** until he has complied with this rule.

For dates of registration see calendar on inside of front cover. The office is open from 8:30 a. m. to 5 p. m. and from 7:00 to 9:30 p. m. on all the week days except Saturday, and from 8:30 to 12 noon on Saturday. From September 12 to October 1 and from January 30 to February 18 inclusive the office will be open continuously from 8:30 a. m. to 8:30 p. m. on all week days except Saturday and it will be open on Saturday from 8:30 a. m. to 3:00 p. m.

FEES

A fee of five dollars ($5.00) a credit hour is charged for all university extension work. Laboratory fees and textbooks are additional. All fees are payable at the time of registration. A fine of three dollars ($3.00) is charged for late registration in the day classes and one dollar ($1.00) for late registration in the evening classes.

ATTENDANCE

Evening Classes

Students desiring University credit are not allowed more than two absences per semester in any two-credit course. Those having absences in excess of that number shall satisfy the instructor that the work has been made up by special examination or otherwise before credit is given. In certificate courses four absences are allowed. Absences in excess of this number are to be made up in a manner similar to the procedure as outlined in the credit courses above.

All students who receive credit toward a certificate or a degree must take the final examination and make a minimum grade of 70 per cent for the course.

Day Classes

It is expected that every student will be present at all the meetings of the classes in which he is enrolled. Any student who at the date of the mid-semester examination in any course has been absent from more than five per cent of the total number of meetings to be held during that semester and

who fails to pass said mid-semester examination may be required to drop the course with failure. Any student whose percentage of absence for any semester in any course exceeds ten per cent of the total number of meetings scheduled for that course may be excluded from the final examination and given a condition.

Absence from a recitation immediately preceding or following Thanksgiving Day or the Christmas or Spring Recess shall count as two ordinary absences.

Absence from a quiz section carries a grade of zero for the period covered by that quiz section unless the work is made up to the satisfaction of the instructor concerned.

CHANGE OF STUDIES AND DROPPING STUDIES

Day Classes

A student who wishes to make a change in his schedule of studies must secure the written approval of his counselor and of the head of the department concerned.

A student who drops a subject without written permission secured in advance will receive a failure in that study and may be subject to further discipline by the faculty.

REFUNDS

Evening Classes

All applications for refunds must be made in writing.

Applications for cash refunds must be made before the end of the third week of instruction. A registration fee of $2.00 is retained on all refunds.

No cash refunds are given after the end of the third week of instruction.

Students who apply for refunds from the fourth to the sixth week inclusive will receive a credit memorandum card covering a fraction of the fee paid. This card is not transferable but may be applied on a future enrollment by the student to whom it is issued.

No refunds of any kind are made after the first six weeks of instruction.

Day Classes

Partial refunds to students withdrawing from the day classes are made upon the following basis if written notice is given at the time of withdrawal: within two weeks from the first day of instruction, 80% refund; within four weeks, 60%; within six weeks, 40%; within eight weeks, 20%; after eight weeks, no refund.

STUDENT ACTIVITIES

Essayons Club. The Essayons Club is an organization of the girls of this school. It has a two-fold purpose: to promote athletics and social ac-

tivities among the girls. Every week the club has general discussions on topics selected by the girls themselves. These gatherings are supervised by a faculty adviser. Athletics include swimming, bowling, hiking, basketball, and tennis according to the season and the girl's individual inclinations. Officers are elected semi-annually during the last month of the semester.

Mathematics Club. The Mathematics Club is an organization of the students who are interested in mathematics. The club holds monthly meetings at which papers are presented by students and members of the faculty. A portion of each meeting is spent in playing mathematical games and in the solution of mathematical puzzles. The purpose of the club is to stimulate the interest of students in mathematics by discussing many interesting phases of the subject which cannot be taken up in the classroom, and by showing the fundamental relation of mathematics to the other sciences.

Women's Rest Room

German Club. The German Club aims to acquaint its student members with Germany and its people and with the achievements of Germany in the fields of art, science, and literature. In addition it furnishes supplementary practice in language work. The club meets twice a month and is open to all students interested in the German language. Musical numbers, presentation of plays, recitations, short talks on cultural subjects, and singing of popular folk-songs make up the programs. Other meetings held during the year are of a purely social character intended to promote good fellowship. Some of the meetings will be open to the public.

Spanish Club. All students now studying Spanish as well as others who have studied Spanish in the past are eligible to membership. The members plan to hold monthly meetings with carefully prepared programs. Each program consists of two distinct parts: first, a formal program of special numbers such as talks, reports, music, dancing, dialogues or plays; second, a social program with informal group songs, games, and contests.

Spotlight Club. Students desiring experience in acting, producing, costuming, or writing plays are welcome in the Spotlight Club. A short dramatic program is given at each of the monthly meetings, and two public programs are given each year.

Intercollegiate Debates. Tryouts are held early in the fall to choose a debate squad. During the year debates are held with the University of Wisconsin and other schools. Any student carrying a normal credit load is eligible for these tryouts.

Physical Education. The requirement in Physical Education, for both men and women students, is three hours a week. This requirement can be met by taking either regular gymnasium work or by combining gym work with other forms of athletics.

All student activities, such as student dances, Spotlight plays, etc., must terminate by May 13.

THE LIBRARY

The library was organized in 1928. Starting with a collection of approximately 1,000 books, which comprised the library in the old Extension building, the library is now a collection of 4,500 volumes. More than 60 periodicals are currently received by the library.

Recently the library has been the recipient of a very fine collection of 500 books and 400 pamphlets on socialism, most of them in the German language, as well as a complete file of topographical and geological maps of the states, presented by Mrs. Victor L. Berger from the private library of her husband, Victor L. Berger. This collection is known as the Victor L. Berger collection.

The library is housed in Rooms 210-211 on the second floor of the University Extension Building. During the school year the library is open daily from 8:30 a.m. to 9:30 p. m. and on Saturday morning from 8:30 to 12:00, with shorter hours during vacations. Books may be drawn for home use for a two-week period, excepting those reserved by the faculty for supplementary reading and books of general reference.

For research work by the faculty the library is allowed to borrow from the University of Wisconsin library through the inter-library loan system.

PHYSICS EXHIBITION

The Department of Physics gives an annual exhibition to which the general public is invited. At this time the entire Physics department is on display. A number of striking and unusual experiments are demonstrated by students of the department. A feature of the exhibition is a series of demonstration lectures on liquid air.

SCHOLARSHIP AWARDS

The Gamma Kappa Phi Fraternity awards a cup on which is engraved the name of the student who is voted each year by the faculty as having achieved a superior record in general scholarship and having shown school loyalty and fraternal spirit. In addition, a scholarship emblem is presented to the winner. Students competing for this honor must have taken at least three semesters' work at this institution.

A similar cup is awarded, through the courtesy of Mr. George Brumder, by the Milwaukee Herold for superior work in German. The candidates competing for this award must have studied German at the Extension Division for at least two semesters and must have obtained not less than 28 credits in that year, with a minimum average of 80.

Sophomore Honors are awarded by the faculty at the close of the year to those students who have made a record similar to that required for obtaining the same honor at the University of Wisconsin. Sophomore High Honors are also awarded.

A special award is granted each year to the sophomore who has the highest number of grade points per credit for two full years' work at the Extension Division.

Freshman Honors are awarded each year to three students having the highest number of grade points per credit for that year. The standing of the various students shall be computed upon the basis of their first semester grades and the mid-semester grades of the second semester. A student eligible for this award shall have carried a full schedule of work, that is to say, shall have completed a minimum of 28 credits of work by the end of the semester in which the award is made.

THE HENRY HARNISCHFEGER AWARD

Beginning with the academic year 1929-30, and extending over a period of five consecutive years, an annual prize of fifty dollars is provided by the late Mr. Henry Harnischfeger of Milwaukee for the best German essays. Candidates must have studied German in the high schools of Milwaukee (suburbs included) for at least four semesters. The prizes will be awarded by a jury, consisting of three members, to the students writing the best German essays on an assigned topic. The date of the essay contest, which will be held at the University Extension Center, 623 West State Street, will be communicated to the high school principals and their German staffs two weeks in advance.

H. H. WEST COMPANY AWARD

The H. H. West Company of Milwaukee offers a slide rule each year as a prize to the student in the Two-Year Course in Building Design and Construction whose work has been most satisfactory.

LECTURE BUREAU

The University Extension Division in Madison strives to make its services readily available to societies, organizations, study groups, and the public. It maintains a special bureau through which arrangements may be made for lectures by members of its faculty. These lectures include discussions and demonstrations in the fields of astronomy, business, chemistry, child guidance, linguistics, literature, mathematics, physics, radio, travel, zoology, and other branches of knowledge.

Persons searching for suitable speakers for clubs, assemblies, business or technical gatherings, study groups, should get in touch with the Bureau. The fee for the lecture may be arranged with the Bureau. Information regarding this service may be obtained by telephoning Marquette 7051, or by writing the Lecture Bureau, University Extension Division, Madison, Wisconsin.

THE CLINIC FOR THE CORRECTION OF SPEECH DEFECTS

PURPOSE

The purpose of the Speech Clinic of the University of Wisconsin Extension Division in Milwaukee is to diagnose and treat adults and children who have speech defects. The following are common examples of defects:

Foreign Accent. Individuals of foreign birth or those whose association brings them regularly or daily in contact with foreign speech very often either substitute sounds in the English language for the correct ones, or are unable to pronounce certain sounds in English. Foreign accent can be corrected under proper direction. This may be taken in class or privately.

Lisping. This is a habit generally formed in infancy in which the "s," "z," "th" sounds are not properly employed. It can be easily corrected.

Careless Speech. This includes the running together of words, hesitance, and many other bad speech habits.

Nasality. This includes: what is commonly known as talking through the nose; trouble due to obstruction in the nose; and cleft palate speech.

Faulty Articulation. The inability to produce certain sounds correctly causes faulty articulation. In childhood it is generally termed "baby talk."

Hoarseness and High Pitched Voices. Under this heading, which is more or less self-explanatory, is included certain abnormal vocal conditions of which the person so afflicted is often unaware.

Delayed Speech. The learning of speech is often retarded in an otherwise normal child, making training necessary to stimulate the development of language to a degree appropriate to the age of the child.

Stuttering. Probably the best known among lay people and most dreaded is this speech defect.

TREATMENT

The treatment that will be suggested for speech defects will depend on the diagnosis. Usually a series of weekly appointments with individual instruction are suggested. At these appointments the student will take part in corrective exercises and be given directions for home practice. These treatments may be commenced or terminated at any time, depending upon the individual case.

STAFF

The staff consists of Dr. Robert West and Mrs. Schutt. Dr. West is head of the Committee on Defects of Speech of the President's White House Conference. He was formerly on the faculty of the University of Iowa and

the University of Michigan and is at present Professor of Speech Pathology at the University of Wisconsin in Madison.

Aline Ziebell Schutt, who has been a student of Dr. West, is a graduate of the University of Wisconsin where she received her professional training in speech correction. She has had successful practical experience in this field.

REGISTRATION

Registration consists of filling out a registration blank and paying a $2.00 diagnosis fee at the Extension Building, any time after September 1. The applicants will be notified when Dr. West will hold the speech clinic to diagnose and suggest the type of treatment necessary.

FURTHER INFORMATION

The Speech Clinic staff welcomes conferences with any one wishing further information concerning the Clinic or speech defects. There will be no obligation whatsoever for these appointments with Mrs. Schutt. Call Marquette 7051 for an appointment.

For information about foreign accent correction, see page 94.

UNIVERSITY CREDIT COURSES

ADMISSION

Entrance requirements are stated in units of high school work, a term which is not to be confused with the term credit as applied to university work. A unit represents five class periods a week in one branch of study for a school year of at least 36 weeks. Two laboratory periods in any science or vocational study are considered equivalent to one class period. In closely allied subjects, such as botany and zoology, not usually taught throughout an entire year, units may be constructed by adding the respective time values of the subjects. Three periods a week for a year and a half may be counted as one unit.

No one may receive credit unless he has satisfied the entrance requirements of the University and has had the necessary prerequisites for the desired courses. **The responsibility for complying with these rules rests with the student; the Extension Division will not guarantee credit unless the student has filed in advance records of all credits from other schools including high schools.** Adult students who do not have the necessary entrance credits and prerequisites may be admitted to these credits courses, but they will not receive University credit.

Throughout this bulletin all courses marked with an asterisk (*) involve credit toward a University degree for properly qualified students.

GENERAL REQUIREMENTS

Graduation from high school with fifteen units, distributed as follows, is the fundamental requirement for regular admission to any college or course in the University:

I. Two units of English are required of all entrants; three units are recommended for all and are required of those who do not offer two units of a foreign language.

II. One unit of algebra and one of geometry are also required of all, with an additional half or whole unit of algebra recommended for those seeking admission to the College of Engineering.

III. Two units of science or history, or two units of one of the following foreign languages—French, German, Greek, Hebrew, Italian, Latin, Norse, or Spanish—must be presented by all. If foreign language is offered, there must be at least two units in a single language, although in exceptional cases one unit may be offered as the optional subject.

IV. The remaining units necessary to bring the total to fifteen must be offered from Groups A and B, with a maximum of four units from Group B and a total of not more than four units in any single subject.

GROUP A

	Units
English	1-2
Foreign Language	
French	1-4
German	1-4
Greek	1-3
Hebrew	1-2
Italian	1-2
Latin	1-4
Norse	1-2
Spanish	1-4
History and Civics	
History	1-4
Civics	½ -1
Economics	½
Mathematics	
Advanced Algebra	½ -1
Solid Geometry	½
Trigonometry	½
Science	
Botany	½ -1
Biology	1
Chemistry	1
General Science	½ -1
Geography	½ -1
Physics	1
Physiology	½
Zoology	½ -1

GROUP B (not to exceed a total of four units)

	Units
Agriculture	1-4
Bookkeeping	½ -2
Typewriting (if not combined with short hand only ½ unit will be allowed)	½ -1
Shorthand	2
Commercial law	½
Commercial arithmetic	½
Commercial geography	½
[1]Business organization	½
[1]Salesmanship	½
[1]Office practice	½
Domestic science	1-2
Domestic art	1-2
Drawing, art, and design	1-4
Mechanical drawing	1-4
Shop work	1-2
Shop work and drawing	1-4
Music	1-4
History and appreciation	1
Theory and harmony*	2
Choral music	½ -1
Orchestra	½ -2
Band	½ -2
Applied music	½ -2
Optional (excluding drill subjects)	½ -1

([1]To be accepted for entrance only when offered during the junior or senior year.)
(*Not less than 2 units accepted.)

OTHER METHODS OF ADMISSION

For information about admission on the adult special basis and admission upon examination apply to the Recorder, University Extension Division, Milwaukee.

UNDERGRADUATE CREDIT

The total number of credits that may be earned in the Extension Division combining instruction in day classes, evening classes, and correspondence can not total more than the equivalent of two years' credit in any curriculum.

Graduates of two-year normal schools or of junior colleges, or those who have finished two years of work at a four-year college are permitted to elect suitable courses of junior rank if they are offered at the Milwaukee Center. Such students may elect freshman or sophomore work if the requirements for the degree they seek include such work. The nature of this work will be determined by a committee of the faculty of the Milwaukee Center, and the amount is not to exceed two year-courses.

All candidates for degrees must expect to take their senior year in residence. The minimum residence requirement is 30 credits and 30 grade-points, to be earned in at least two semesters at Madison (or six summer sessions, in

no one of which may less than four credits be carried). All the requirements of the major subject must be met, including at least 15 credits and 15 grade-points in advance work (in some departments 20) in residence. If application is made in advance, very exceptional cases may be given special consideration by the dean or the executive committee of the College of Letters and Science.

Credits and Grade Points

Throughout this bulletin the courses marked with an asterisk (*) involve credit toward a university degree for properly qualified students. In order to receive a degree the student must have not only the number of credits required in the course which he is pursuing, but his studies must reach a certain average of excellence. This standard is fixed by the grade-point system, which requires for graduation from any course as many points as credits. The following table shows the University scale of grading, together with the number of points per credit for each grade:

Percentage	Grade	Points per Credit
93–100	Excellent (A)	3
85– 92	Good (B)	2
77– 84	Fair (C)	1
70– 76	Poor (D)	0
60– 69	Condition	0
Below 60	Failure	0

A student in the general courses in Letters and Science who has received a grade of **B** in each subject of the preceding semester may take not to exceed 18 credits.

NEW REQUIREMENTS IN THE COLLEGE OF LETTERS AND SCIENCE

Entering freshmen will be given placement examinations in English, foreign languages, and mathematics (where the students expect to continue mathematics in college); and may take the attainment examination in English, foreign languages, history, mathematics, and (or) the sciences. A student who passes the attainment examination of a university course will not receive therefor credit toward graduation; but will receive credit toward subject requirements, and thus obtain a greater freedom of election.

For language requirements for the B.A. degree, see page 85.

Students who have secured a total of 60 credits and 60 grade points, and who have pursued for two years approved programs which would normally lead to the degree of B.A., B.S., or Ph.B., will be given certificates entitling them to the rank of Junior Graduate in Liberal Studies.

Such students who at the same time meet the specific requirements of any vocational course credited by the College of Letters and Science will have said fact noted on their certificates.

At the close of the sophomore year, students will be classified, according to their university records, into three groups:

I. Those whose point-credit ratio for the two-year period is 1.3 or higher.

II. Those whose point-credit ratio is 1.1 but less than 1.3.

III. Those whose point-credit ratio is lower than 1.1.

Admission to the junior class will be automatic for students belonging to Class I. Students belonging to Class II may apply to the Committee on Promotion for admission to the junior year, and their applications may be supported by written recommendations from members of the teaching staff under whom the student has worked during his sophomore year. In general, students belonging to Class III will be excluded from the junior year, although the Executive Committee of the College may recommend to the Committee on Promotion the admission of those whose records during the sophomore year show a substantial improvement over their work in the freshman year.

Any student who has been refused admission to the junior year may reapply after a lapse of at least one year or after having successfully carried at least one semester of satisfactory work in another college or university. Applications will be considered on the following bases: (a) the high-school and university records of the student; (b) the record of the student since leaving the University; and (c) other relevant circumstances. Students who have been employed during a period of absence may substantiate their applications by recommendations from employers.

UNIVERSITY COURSES OF THE FRESHMAN AND SOPHOMORE YEARS

The University Extension Division offers freshman and sophomore programs of study in the following courses:

Letters and Science
Engineering
Chemistry
Pre-commerce
Pre-medical
Pre-legal
Pre-journalism

All of these courses have been approved by the respective residence departments at Madison and will carry full credit toward a university degree.

OUTLINES OF LETTERS AND SCIENCE CURRICULA

Recommended Sequences for Freshman and Sophomore Years

(For complete information about requirements, see bulletin of College of Letters and Science)

1. B.A. General Course (includes foreign language)

Freshman		Credits per semester
English 1a-1b		3
Foreign language		3–4
Mathematics	Two of these are required, at least one to be taken in the freshman year.	4
Science		5
History		3
Physical Education		..
		14-16

Two foreign languages may be elected if desired. Mechanical drawing (3 credits) may be elected if the student wishes to take only one study from the mathematics-science-history group in the freshman year.

Sophomore	Credits per semester
English 30a-30b	3
or 33a-33b	2
Foreign language (if requirement has not been met)	3-4
Electives	?
(Freshman requirements if not met the first year)	?
	14-16

2. Ph.B. General Course (without foreign language requirement)

Freshman		Credits per semester
English 1a-1b		3
Science	One or both of these or two sciences	5
Mathematics		4
Mathematics	Two of these are required, at least one to be taken in the freshman year.	4
History		3
Foreign lang.		3–4
Physical Education		..
		14-16

Mechanical drawing (3 credits) may be elected in place of one subject in either of the groups specified above, provided the student takes the second subject in his sophomore year.

Sophomore

The study list for the sophomore year must include English 2, intermediate composition, two credits each semester, unless the student has passed an attainment examination for reading knowledge in one foreign language. The study list must also include whatever subjects are necessary in order to complete the science-mathematics option and the history option commenced in the freshman year. If the philosophy and psychology option is chosen, work

on it should commence during the sophomore year. In the event the foreign-language option has been met by examination, the student should have about twelve credits of free electives each semester of this year.

3. Chemistry Course (B.S. degree)

Freshman	Credits per semester
English 1a-1b	3
Chemistry 1a-1b	5
German or French	3–4
Mathematics	3–4
Physical Education	..
	16

Sophomore	
Chemistry 11a-11b	5
German or French	3–4
Physics 1a-1b	5
Mathematics	3
Physical Education	..
	17

4. (a) Pre-commerce Course (leading to B.A. degree)

Freshman	Credits per semester
English 1a-1b	3
Foreign language	3-4
Mathematics 1-7	4
Science 5 credits or History 3 or 5 credits	3–5
Physical Education	..
	14-16

Sophomore	
English 30a-30b	3
or 33a-33b	2
Economics 1a-1b	4
Foreign language	3–4
Geography 5-6	3
Electives	4–2
Physical Education	.
	15-16

(b) Pre-commerce Course (non-language, leading to Ph.B. degree)

Freshman	Credits per semester
English 1a-1b	3
Mathematics 1, 2 or 3-7*	4–3
Science	5 or 10
(History)	(3)
Physical Education	--
	14-16

*Mathematics 7, second semester

Sophomore	
English 2a-2b*	2
Economics 1a-1b	4
Geography 5-6	3
(History)	(2–3)
Electives	5–2
Physical Education	--
	14-16

*Not required if foreign language option for Ph.B. degree has been absolved.

5. (a) Three-year Premedical Course (leading to B.A. degree)

Freshman

First Semester	Credits	**Second Semester**	Credits
English 1a	3	English 1b	3
Chemistry 1a	5	Chemistry 1b	5
French or German	3–4	French or German	3–4
(Latin 1)*	5	(Latin 2)*	5
Physical Education	--	Physical Education	--
	15-16		15-16

*Required only if student has not had two years of high school Latin.

Sophomore

English 30a	3	English 30b	3
or 33a	2	or 33b	2
Zoology 1	5	Zoology 2 (or Botany 1)	5
Physics 1a	5	Physics 1b	5
French or German	3-4	French or German	3–4
Physical Education	--	Physical Education	--
	15-16		15-16

(b) Two-year Premedical Course (leading to B.S. degree)

Freshman

First Semester	Credits	Second Semester	Credits
English 1a	3	English 1b	3
Chemistry 1a	5	Chemistry 1b	5
Physics 1a	5	Physics 1b	5
French or German	3–4	French or German	3–4
(Latin 1)*	5	(Latin 2)*	5
Physical Education	..	Physical Education	..
	16-18		16-18

*Required only if student has not had two years of high school Latin.

Sophomore

French or German	3-4	French or German	3–4
Zoology 1	5	Zoology 2 (or Botany 1)	5
Elective (Chem. 11 recommended)	5	Chemistry 20, 21	4
Elective	3–4	Elective	3–6
Physical Education	..	Physical Education	..
	16-18		16-18

6. Pre-legal Course

Same as either Curriculum 1 or 2 above.

7. Pre-journalism Course

Freshman	Credits per semester
Journalism 1a-1b	1
English 1a-1b	3
Foreign language (one or two)	3–8
History 1a-1b, 2a-2b, 5a-5b, or 10a-10b	3
Science	5
Physical Education	..
	15-16

Sophomore

English 30a-30b	3
Economics 1a-1b	4
Electives	8–9
Physical Education	..
	15-16

OUTLINES OF ENGINEERING CURRICULA

Leading to the Degree of Bachelor of Science

Civil Engineering

Freshman

First Semester

	Credits
Math. 51—Elementary analysis	5
Draw. 1—Elements of drawing	3
Chem. 2a—General chemistry	4
Engl. 1a—Freshman English	3
Top. Engr. 1—Elementary surveying	2
Physical education	0
	17

Second Semester

	Credits
Math. 52—Elementary analysis	5
Draw. 2—Elements of drawing	3
Chem. 2b—General chemistry	4
Engl. 1b—Freshman English	3
Top. Engr. 2—Elementary surveying	2
Physical education	0
	17

Sophomore

	Credits
Math. 54—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5
Draw. 3—Descriptive geometry	3
Top. Engr. 3—Land surveying	3
Ry. Engr. 1—Railway curves	2
Physical education	0
	17

	Credits
Math. 55—Integral calculus	4
Physics 52—Lectures and lab. practice	5
Mechanics 1, 2—Statics, dynamics	5
Top. Engr. 104—Advanced surveying and mapping	3
Physical education	0
	17

Mechanical Engineering

Freshman

First Semester

	Credits
Math. 51—Elementary analysis	5
Engl. 1a—Freshman English	3
Draw. 1—Elements of drawing	3
Chem. 2a—General chemistry	4
Non-professional elective	2
Physical education	0
	17

Second Semester

	Credits
Math. 52—Elementary analysis	5
Engl. 1b—Freshman English	3
Draw. 2—Elements of drawing	3
Chem. 2b—General chemistry	4
Non-professional elective	2
Physical education	0
	17

Sophomore

	Credits
Math. 54—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5
Mach. Des. 1—Mechanism	4
Draw. 3—Descriptive geometry	3
Non-professional elective	2
Physical education	0
	18

	Credits
Math. 55—Integral calculus	4
Physics 52—Lectures and lab. practice	5
Mach. Des. 2—Design practice	1
Mechanics 1, 2—Statics, dynamics	5
Speech 8—Extempore speaking	2
Physical education	0
	17

Electrical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Chem. 2a—General chemistry	4	Speech 8—Extempore speaking	2
Non-professional elective	2	Chem. 2b—General chemistry	4
Physical education	0	Physical education	0
	17		17

Sophomore

	Credits		Credits
Math. 54—Differential and integral calculus	4	Math. 55—Integral calculus	4
Physics 53—Lectures and lab. practice	3	Physics 54—Lectures and lab. practice	3
Draw. 3—Descriptive geometry	3	Mechanics 1, 2—Statics, dynamics	5
Econ. 1a—Elements of economics	4	Top. Engr. 108 (elective)	3
Machine Des. 1—Mechanism (elective)	4	Econ. 1b—Elements of economics (elective)	4
Physical education	0	Physical education	0
	18		19

Students who wish to complete the electrical engineering course in four years are advised to transfer to the College of Engineering at Madison at the end of the third semester. Otherwise it will be necessary to attend one summer session in order to complete the required work within the four year period.

Chemical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Elective	2	Elective	2
Physical education	0	Physical education	0
	17		17

Sophomore

	Credits		Credits
Math. 54—Differential and integral calculus	4	Math. 55—Integral calculus	4
Chem. 14—Quantitative analysis	5	Economics 1a—Elements of economics (elective)	4
Physics 51—Lectures and lab. practice	5	Physics 52—Lectures and lab. practice	5
Mach. Des. 1—Mechanism	4	Mechanics 1, 2—Statics, dynamics	5
Physical education	0	Physical education	0
	18		18

Mining Engineering, Metallurgical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Elective	2	Top. Engr. 108—Short course in surveying	3
Physical education	0	Physical education	0
	17		18

Students who wish to complete the chemical engineering, mining engineering, or metallurgical engineering courses in four years are advised to transfer to the College of Engineering at Madison at the beginning of the sophomore year.

EVENING CERTIFICATE COURSES
BUSINESS

The completion of a well-rounded program of study is of much greater benefit to the student of Business than the taking of separate courses at random. Realizing this, the University of Wisconsin, through the Extension Division, will give a special certificate to young men and women who satisfactorily complete a series of related courses in any one of six special fields. The certificate may be earned in Accounting, in Marketing and Advertising, in Finance and Credit, in Industrial Management, in General Business, or in Secretarial Work. For certificate courses in Real Estate see page 32.

In order to secure a certificate, a student must have completed satisfactorily twenty-four semester hours (ordinarily twelve courses) in one of the six special fields in which certificates are granted, including all the required courses and certain elective courses. No course is completed unless a final examination is taken. The special requirements for each group are listed below.

To complete the requirements for a certificate in three years, it will be necessary, ordinarily, for the student to attend classes on an average of two evenings a week. Students who are interested in taking a program of courses in preparation for the certificate should consult a member of the business faculty.

The following schedules of subjects show which courses are required and which courses may be elected in each of the six certificate groups. In addition to the required courses the student must elect, with the approval of his faculty adviser, enough courses to bring his total up to twenty-four semester hours. Each required course is indicated by a dagger (†).

Certificate Course in General Business

†Business Principles
Business English or English 1a
English 1b
†Business Correspondence
†Accounting 1M
†Accounting 2M
Accounting 3M
Accounting 4M
Business Economics 355aM and bM
Corporation Management
†Business Law 101M
Business Law 102M
Business Statistics
Business Law 103M
Business Law 104M
Business Psychology
Factory Management
Labor Problems
Labor Management
†Marketing
Advertising Procedure
Salesmanship
Public Speaking
Banking
†Business Finance
Investments
Fundamentals of Real Estate Practice
Real Estate Financing

Certificate Course in Accounting

Business Principles
†Accounting 1M
†Accounting 2M
Business English or English 1a
English 1b
Business Correspondence
†Accounting 3M
†Accounting 4M
†Auditing 5aM
†Auditing 5bM
†Cost Accounting 9aM
Cost Accounting 9bM
C. P. A. Problems
Income Taxation
Business Economics 355aM and bM
†Business Law 101M
†Business Law 102M
Business Law 103M
Business Law 104M
Banking
Business Finance
Analysis of Financial Statements
Advanced Accounting Problems
Governmental Accounting
Investments

One who intends to enter public accounting work will need to take more than the twenty-four semester hours which are necessary for this certificate. His faculty adviser will gladly make suggestions for further study.

Certificate Course in Marketing and Advertising

†Business Principles
Business English or English 1a
English 1b
†Business Correspondence
†Marketing
General Psychology
†Business Psychology
Business Economics 355aM and bM
†Advertising Procedure
†Advertising Campaigns
Retail Advertising
Banking
Business Finance
Investments
Credits and Collections
Business Law 101M
Business Law 102M
Business Law 103M
Business Law 104M
†Salesmanship
Sales Management
Public Speaking
Retail Store Management
Accounting for Executives
Real Estate Selling

Certificate Course in Finance and Credit

†Business Principles
†Accounting 1M
†Accounting 2M
Business Economics 355aM and bM
Business English or English 1a
English 1b
Business Correspondence
†Credits and Collections
†Business Finance
†Banking
†Analysis of Financial Statements
Business Law 101M
†Business Law 102M
Business Law 103M
Business Law 104M
†Investments
Real Estate Financing
Bank Administration
Legal Aspects of Credits and Collections
Life Insurance Fundamentals

Certificate Course in Industrial Management

†Business Principles
†Accounting 1M
†Accounting 2M
†Cost Accounting 9aM
†Cost Accounting 9bM
Business English or English 1a
English 1b
Business Correspondence
Business Economics 355aM and 355bM
General Psychology
Business Psychology
†Labor Problems
†Labor Management
Business Law 101M
Business Law 102M
Business Law 103M
Business Law 104M
†Factory Management
Public Speaking
Business Finance

Certificate Course in Secretarial Work

†Business Principles
†Business English or English 1a
English 1b
†Business Correspondence
General Psychology
Business Psychology
†Accounting 1M
Accounting 2M
†Secretarial Training Course 714M
†Secretarial Training Course 715M
Business Economics 355aM and bM
Business Law 101M
Business Law 102M
Public Speaking
Marketing
Advertising Procedure
Salesmanship
Banking
Business Finance
††Electives

††Those students who know definitely in what fields they are preparing to do secretarial work should go beyond the subjects listed on this page and choose electives from business courses in the field selected such as Advertising, Accounting, Finance, or Real Estate. This program is also intended to meet the cultural needs of the students who enroll in it. Students may, therefore, choose electives in such fields as English literature, Modern Language, History, Psychology, and Social Sciences.

CERTIFICATE COURSES IN REAL ESTATE

The Milwaukee Real Estate Board will issue an official certificate to anyone who is certified by the University Extension Division as having satisfactorily completed four of the Real Estate courses listed below. To students who satisfactorily complete eight of the Real Estate courses listed below will be issued a University Extension Division certificate endorsed by the National Association of Real Estate Boards.

Real Estate Courses

Fundamentals of Real Estate Practice
Real Estate Law
Real Estate Transfers and Conveyancing
Real Estate Financing
Problems of Land Utilization
Selling of Real Estate
Real Estate Appraisals
Property Management and Real Estate Office Management
City Planning and Zoning

ENGINEERING

AERONAUTICS

A special certificate in Aeronautics may be obtained by successfully completing the following group of courses covering four semesters' work of two evening classes a week.

The various subjects in the group on Aeronautics are designed to give a well rounded knowledge of the technical problems involved in aviation, although pilots, mechanics, airport workers, and office workers may take certain subjects to fit their immediate needs. The primary purpose in offering this certificate group is to give students an opportunity to gain a broader view of aviation by taking the complete list of subjects. They thus become better fitted for their present work or qualified to advance to positions of greater responsibility in the aeronautics industry.

The material treated in the courses is up to date in every respect. A special effort is made to keep it as practical and useful to the student as possible.

Prerequisite: High school education or courses in algebra, physics, and drawing.

First Year

First Semester	Second Semester
Elementary Aeronautics, Aero 1	Airplane Engine Theory and Details, Aero 3
Aircraft Construction, Aero 2	Airplane Engine Maintenance, Aero 4

Second Year

First Semester	Second Semester
Aviation Law and Insurance, Aero 5	Special Problems in Aero Engineering, Aero 8
Cost Accounting in Aviation, Aero 6	Drafting in Aero Engineering, Aero 9
or	
Meteorology and Air Navigation, Aero 7	

COURSES FOR BUILDERS

Structural Design, the first group of subjects outlined below and offered in evening classes, is intended for men who are working in offices or drafting rooms on structural work, or for men who are interested in structural work. Building Design, the second group outlined, is intended for men who are working or plan to work in architects' offices, and for those who are interested in architectural work. Both courses will be of much benefit either to men who plan to enter contracting work in the employ of some contractor or to men who intend to go into business for themselves. A University Ex-

tension Certificate is given for the successful completion of either group of courses consisting of six semesters' work of two nights a week, or the equivalent.

The demand for competent workers in the fields of design and building is constantly growing, and the responsibilities of men in charge are great. Financial estimates must be accurate; architectural designs must be pleasing in appearance and in ornamental details. Evening study under competent teachers offers the only practical way for the average man to keep pace with modern progress in this field. He will still need the architect and the structural engineer for the large and more important projects, but the training in these courses will fit him to hold more responsible positions, to bid more intelligently and accurately, and to plan architectural details and supervise small projects more competently.

STRUCTURAL DESIGN

First Year

First Semester	Second Semester
Estimating for Builders 497aM	Estimating for Builders 497bM
[1]Structural Theory 450aM	[2]Structural Theory 450bM

Second Year

[3]Steel Design and Details 422aM	[3]Steel Design and Details 422bM

Third Year

[3]Reinforced Concrete 417aM	[3]Reinforced Concrete 417bM

[1]For description, see Statics, page 66.
[2]For description, see Strength of Materials, page 66.
[3]Two evenings a week.

BUILDING DESIGN

First Year

First Semester	Second Semester
Architectural Drawing 243aM	Architectural Drawing 243bM
Estimating for Builders 497aM	Estimating for Builders 497bM

Second Year

Architectural Design 1aM	Architectural Design 1bM
[1]Structural Theory 450aM	[2]Structural Theory 450bM

Third Year

[3]Steel Design and Details 422aM	[3]Steel Design and Details 422BM

Note: Algebra and Trigonometry are required for Structural Theory. Elementary Engineering Problems is recommended. Structural Theory must be completed before Steel Design and Details is taken up.

[1]For description, see Statics, page 66.
[2]For description, see Strength of Materials, page 66.
[3]Two evenings a week.

HEATING, VENTILATION, AND REFRIGERATION

This two-year course is offered for builders, draftsmen, engineers, contractors, estimators, building inspectors, and others who will be benefited by a practical course which will help them to plan, install, estimate, and inspect the various types of mechanical equipment which enter into the construction of our modern buildings. The aim throughout the course is to make the work extremely practical.

The course provides a good foundation training for those with little or no previous experience or instruction in the subjects outlined; it should also prove valuable to those who wish a review of the fundamental principles involved in the various subjects.

A certificate is given by the University Extension Division upon the satisfactory completion of the course.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics, especially arithmetic, is required for entrance.

First Year

First Semester	Second Semester
Elementary Engineering Problems 212M	Freehand Industrial Sketching. 203M. Sp.
Estimating for Builders 497aM	Estimating for Builders 497bM

Second Year

Heating and Ventilating 223aM	Heating and Ventilating 223bM
Refrigeration 222M	Mechanical Equipment of Buildings 224M

MACHINE DESIGN

Students in evening classes may qualify for the Special Certificate of the Extension Division in Machine Design by successfully completing six semesters' work of two nights a week, or the equivalent.

The student who intends to become a machine designer should have as basic training some experience in shop practice. This he must secure in some shop where he will learn the uses and limitations of lathes, planers, and milling machines. At the same time he can qualify as a tracer by taking the evening class work in mechanical drawing. This will enable him to secure the necessary skill to advance into the drafting room. He must follow this up with a study of mechanical movements and of mechanical principles. The properties and strength of cast iron, steel, brass, and other material should be thoroughly understood; these subjects are covered during the second year. The work of the third year treats of the strength and proportioning of parts to withstand the stresses to which they will be subjected in the finished machine.

Prerequisites are one year of algebra and elementary trigonometry. The evening course in Elementary Engineering Problems is recommended the first year and will be counted as an elective.

First Year

First Semester	Second Semester
Mechanical Drawing 1	Mechanical Drawing 2

Second Year

Mechanism 208M	Strength of Materials 207M
[1]Elementary Mechanics 206aM	Elementary Mechanics 206bM

Third Year

Machine Design 209aM	Machine Design 209bM

Elective—Two evenings per week for one semester, or one evening per week for two semesters. Mathematics is recommended.

With the permission of the head of the Engineering Department, experienced draftsmen may substitute other Mechanical Engineering subjects for Drawing 1 and 2.

[1]For description, see Statics, page 66.

LIBERAL EDUCATION

The University of Wisconsin Extension Division in Milwaukee has expanded the facilities for adult education by offering, without paralleling the usual college subjects, a series of courses aiming to give the foundation of a liberal education. The courses are on a college or university plane, but no credit towards a degree is involved. The program is in line with the most recent experiments in this type of education in Europe and America.

The underlying principles and aims of the series of Liberal Education courses may be summed up as follows: To give an opportunity for adults to acquire an education which involves more than the obtaining of information and skill—an education which will lead to emancipation from a "drifting with the group" opinion; an education which will engender capacity for self-criticism; and above all, an education which will create a feeling for those things that make life richer and more significant.

With regard to the method of conducting classes, two types of courses are offered: First, lecture courses accompanied by discussions; and, second, courses organized on the basis of co-operative group activities in which the instructor functions as guide and adviser. In certain discussion courses the enrollment is limited.

The requirement for a certificate in Liberal Education is ten semester courses. Unless special permission is granted to the contrary, students must choose at least one course from each of the six groups in "Series A." (See page 38). The remaining four courses may be selected from "Series A," "Series B," the University credit courses, the Business certificate courses, or the Engineering certificate courses. Credit towards a certificate will be given to students who have attended the courses with reasonable regularity. Anyone wishing to take the semester examination may do so for his own satisfaction; in such cases the instructor should receive advance notice. If students present credit for work done at other colleges or universities, such credit may be applied in part fulfillment of the requirement for a certificate.

Ability to carry a course and to profit by it is the only requirement for admission.

CURRICULUM IN

Liberal Education Certificate Courses

SERIES A*

Philosophy Group I	Philosophers from Plato to the Present Day
	Modern Ethics
	Thinking
Social Science Group II	Social Problems
	Our Economic Organization
	Problems in Government
	International Relations
	Introductory Psychology
	Psychology of Human Behavior
History Group III	Ancient Civilizations
	Medieval Civilizations
	Contemporary Civilizations
	European Influences upon American Life and Institutions
	History of Religions
Language-Literature Group IV	The Story of Language
	The Bible as Literature
	Masterpieces of Foreign Literatures in English Translations
	English Poetry from the Beginning of the Nineteenth Century
	Shakespeare and His Contemporaries
	Modern American and English Novelists
Art Group V	Appreciation of Painting and Sculpture
	Appreciation of Music
	Appreciation of Drama
Biological and Physical Sciences Group VI	Fundamentals of the Biological and Physical Sciences
	General Biology
	Contributions of Contemporary Scientists of the World

Series B*

- Psychology of the Pre-School Child (Mental Hygiene)
- Psychology of Adolescence
- The Relation of Good Nutrition to Health
- Home Planning and Decorating
- Home and Community Health
- Textiles—Attractive and Appropriate Clothing

University Credit Courses

- English Composition
- Short Story Writing
- English Literature
- American Literature
- Psychology
- Education
- Economics
- Sociology
- Geography
- Physics
- Chemistry
- Biology
- History
- Mathematics
- Latin
- French
- German
- Spanish

LIBERAL EDUCATION

Business Certificate Courses	**Engineering Certificate Courses**
Public Speaking	Aeronautics
Business Principles	Architectural Design
Business Economics	Architectural Drawing
Labor Problems	Heating and Ventilating
Business Law	Mechanical Drawing
Money and Banking	Mechanics
Business Finance	Machine Design
Credits and Collections	Radio
Investments	Mathematics
Business English	
Business Correspondence	
Secretarial Training	
Business Psychology	
Advertising	
Marketing	
Salesmanship	
Real Estate	
Accounting	
Factory Management	

*The courses in Series A and B represent types from which a certain number will be offered each semester. They may be modified or other courses added as the occasion demands.

The University committee sponsoring this program of liberal education courses is composed of the following:

GLENN FRANK, President of the University
ALEXANDER MEIKLEJOHN, Chairman, Experimental College
V. A. C. HENMON, Professor of Psychology
J. H. KOLB, Professor of Agricultural Economics
CHESTER D. SNELL, Dean, University Extension Division
W. H. LIGHTY, Director, Department of Extension Teaching
C. M. PURIN, Director of Extension Division, Milwaukee
M. G. LITTLE, Assistant Dean, Extension Division
M. R. SCHNAITTER, Associate Professor of Economics, Milwaukee

DESCRIPTION OF COURSES

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule which will be issued each semester.

BUSINESS

GENERAL

350M. Business Principles.

A broad view of modern business organization and management will be gained from this course. While particular attention is paid to the basic principles upon which every successful business is built, much useful information is also presented concerning production, marketing, finance, and administration. By giving the student a better insight into the problems of other departments besides his own, the course should increase his usefulness to his company.

Among the subjects discussed are: organizing for ownership control; the corporation; financing a new enterprise; managing the finances of a going concern; how to read the financial page; sources of investment information; business risks; the changing consumer; how manufactured goods are marketed; the independent dealer vs. the large-scale retailer; advertising as a marketing force; scientific management; eliminating waste in business; organizing for production; handling human relations; and teamwork in a business organization.

355aM. Business Economics.

Economics, "the scientific study of industry and business," is a preparatory or foundation subject for all advanced courses in general business, accounting, marketing, advertising, finance, public utilities, and industrial management. This course has been organized so that it covers the subjects usually found in the Economics section of the C. P. A. examinations. Questions used in former Wisconsin examinations are thoroughly reviewed during the progress of the course.

The material deals almost entirely with current problems in commerce, industry, and finance as follows: organization of business, corporation control and management, stocks and bonds, advantages and disadvantages of large scale production, mergers, pools, holding companies, trusts, trade associations, labor organization and policies, money and credit, banking and the federal reserve system.

355bM. Business Economics.

This is a continuation of the beginning course, Business Economics 355aM. The subjects covered are: business cycles, price changes, business fore-

casting, stock exchanges and speculation, transportation, international trade, foreign exchange, taxation, public utilities, market prices, government control of business, socialism, and communism.

It is desirable to take Business Economics 355aM before this course, but it is not required.

1bM. Public Utilities.

The purpose of this course is to present the methods and objectives of public utility regulation, making a critical analysis and comparison of various methods of regulation with special consideration of valuation, depreciation, and rate of return. Various sliding scale and service-at-cost franchises are studied. Included in the above is the work of the Public Utilities Acquisition Committee of Milwaukee and the service-at-cost franchise which it proposed. The regulation of rates, security issues, and standards of public utility service are also considered.

139M. Business Statistics.

The principal objective of this course is to develop the student's ability to undertake the statistical analysis of a business problem. The topics discussed include: sources of business information; classification and tabulation; charting; and the preparation and interpretation of statistical reports. The major portion of the time is spent in a study of the various methods of graphical presentation.

314M. Psychology of Employment and Personnel.

This course is designed particularly for those persons already employed in the personnel field, and also for students who intend to enter that field. The lectures and discussions include experimental studies on character analysis, the interview, letters of application, letters of recommendation, items on the application blank, and other devices in common use. In addition, considerable time is devoted to the more modern techniques of rating scales and tests of various abilities.

For other courses in Psychology, see page 00.

360M. Corporation Management.

Among the topics discussed are: the position of the corporation and its widespread use; limitations of the individual proprietorship; how to incorporate; formation of corporation charters; charter object clauses; how a corporation is dissolved; organization of a trust and holding company; rights, duties, and responsibilities of stock-holders, officers, and directors; practical steps in organizing; promotion and underwriting; investment of capital funds; working capital; operating budgets and financial standards; preparation of corporation reports. This course is intended for officers of corporations and those interested in the management of a corporation.

7M. Beginning Public Speaking.

This is a practical course to help business and professional men and women in their speaking, both in public and in private. A maximum of platform work is required of each student. The theory offered is applied, immediately, to actual speaking situations. The course is designed to teach the individual to prepare and deliver speeches creditably.

707M. Advanced Public Speaking.

This course is offered to those who desire to become better than average speakers. A study is made of the principles of psychology which underlie successful speech, and these principles are tested out in class speaking. Each student undertakes to refine his voice, to polish up his delivery, and to acquire those fine points of technique which are indicative of a good speaking style. It is given for those who have had an elementary course in speech.

For other courses in Speech, see page 93.

ACCOUNTING

21M. Accounting for Executives.

This survey of accounting is provided for executives, investors, and others who are primarily interested in analyzing and interpreting the operating and financial facts of a business. The usual courses in accounting, designed for training those who expect to practice bookkeeping and accounting, contain so much problem work that they are unsuited to the needs of those executives and investors who wish a more general knowledge of the subject.

Throughout the course the function of accounting in depicting the condition of the business occupies the foreground. A thorough foundation is, however, laid in the construction of accounts, in accounting records, and in sources of accounting facts.

No previous knowledge of bookkeeping and accounting is required. Students who plan to prepare to work as bookkeepers and accountants should not take this course; they should start with Accounting 1M.

1M. Introductory Accounting.

This course is primarily intended for those who have no knowledge of bookkeeping. It may be taken advantageously, however, by anyone who has had a half year of high school bookkeeping or who has not studied the subject for some time.

Some of the topics treated are: form of the journal; analyzing the transactions into values received and values parted with; recording these values in the journal; explanations in the journal; debit and credit; form of the ledger; the account; posting to the ledger; trial balance; profit and loss statement; balance sheet; the working sheet; closing the ledger; the direct method of closing; the journal method of closing; accounting for unused fuel and unused office supplies; accounts with proprietor; classification of accounts; principles of debit and credit; notes receivable and notes payable; indorsement of

notes; interest on notes; purchase journal; sales journal; cash journal; the advantages of special journals; merchandise discounts; the three-column cash journal; opening books; nature of the partnership; partner's drawing and investment accounts; division of profit and loss; bank drafts; sight drafts; time drafts; trade acceptances; the note register; bank discount; discounting notes; insurance; sundry general expense; accounts with real estate; depreciation; controlling accounts; accruals; C. O. D. shipments; consignments; trade discounts.

2M. Introductory Accounting.

Some of the topics covered are: vital distinction between capital and revenue; depreciation and accounting for discarded or replaced assets; bad debts; revenue accounts and operating statements for a single department business; operating and non-operating income and expenses; cash journal; retail accounting; departmental revenue accounts; petty cash; analysis of the balance sheet; the comparative balance sheet; comparative operating statement; installment sales; the corporate form of organization; capital stock; the stock book; opening the financial books of a corporation; increase and decrease in capital stock; dividends; corporation bonds; treasury stock; non-par stock; manufacturing revenue accounts; the voucher system; incorporating a partnership; introduction to cost accounting.

Prerequisite: Accounting 1M or one year of bookkeeping in high school.

3M. Accounting Principles and Practice.

The purpose of this course is to round out and complete the study of accounting fundamentals embraced by the regular first year's course. Practice sets are not used, but the student is introduced to more difficult problem material. A study is made of the following subjects: early development of bookkeeping; single entry; single entry profit and loss; development of double entry; classification of accounts; the accounting period; realized and unrealized profits; operating and extraneous profits; deferred and accrued items; working papers; statement of cost of goods manufactured; profit and loss and surplus statements; balance sheet; comparative statements with percentage analysis; ratios; turnovers; partnerships; division of partnership profits; advantages and disadvantages of corporations; trusts as business companies; entries for stock issues; premium and discount; forfeited subscriptions; bonus stock; stock issued for property; purchase of business; organization expense; treasury stock; no-par-value stock; dividends; controlling accounts; factory ledger; private ledger; installment sales; agencies and branches; consignments; single and joint ventures; corrections of profits and surplus; counterbalanced errors; errors not counterbalanced; working papers and adjusted statements.

Prerequisite: Accounting 2M or its equivalent.

4M. Accounting Principles and Practice.

This is a continuation of Course 3M. Considerable advanced problem work is assigned, and several new statements are studied. Partnership ac-

counting is considered at length, including dissolution, admission of partner, retirement, sale of business, incorporations, liquidation, and liquidation in installments. Other topics covered are: insolvency and bankruptcy; receivership; accounts and statements of insolvent concerns; statement of affairs and deficiency account; realization and liquidation account, old and new form; realization profit and loss account; charge and discharge statement; statement of application of funds; adjustments; working papers; statement accounting for variation in net profit; valuation of inventories; retail method; gross profit methods; profit on uncompleted work; notes and acceptances receivable; contingent liability on balance sheet; methods of computing interest and discount; accounts receivable; methods of computing average data; internal check for cash.

Prerequisite: Accounting 3M or its equivalent.

5aM. Auditing.

This course is designed for those who are interested in acquiring a practical knowledge of the principles of auditing. Anyone who has a thorough knowledge of accounting principles and practice may enroll. Students taking the evening courses in accounting are qualified to take this course after they have completed Accounting 4M.

Some of the topics treated are: balance sheet audits; detailed audits; how to begin an audit; division of work between junior and senior; the audit program; working papers; branch auditing; auditing from trial balance and from original records; auditing asset accounts; auditing the liability accounts; the auditor's report; auditor's certificates; practical application of principles by a study of actual cases.

5bM. Auditing.

The student is given the complete working papers of a balanced sheet audit carried through the working trial balance and is required to prepare exhibits and a report. The following topics are treated: audit of current and capital assets; nature of the examination with particular reference to the preparation of working papers; current and capital liabilities; limitations and possible scope of an audit; opening and closing an audit; preparation of reports; duties and responsibilities of the auditor; the detailed audit; purchases and expenses; trial balances; assets and liability items; office methods; depreciation; scope of investigations; a sale or purchase of a business; requirements; period covered; analysis of earnings and expenses; future requirements and economics; system of accounts; elimination of unusual items; adjustments and qualifications; errors in the books; investigation on behalf of a retiring partner when the business is being sold to a continuing partner; investigation of those in charge of reorganizations; investigation for creditors; examination for bankers; investigations after bankruptcy; investigation for purely credit purposes; investigation in patent litigation.

Prerequisite: Auditing 5aM or its equivalent.

9aM. Cost Accounting.

Course 9aM is intended for those who need to know cost accounting, either as an aid in performing their duties in manufacturing plants or as preparation for public accounting. It is open to students who have a thorough knowledge of accounting principles and practice. Students who have completed Accounting 2M will be admitted, although candidates for the certificate in Accounting must have completed 3M and 4M also.

Some of the topics covered are: what cost is; what cost accounting is; control of cost records by general books; information presented by statements; necessity for monthly statements; control of sales, cost of expense; divisional cost; elements of cost; cost formulas; departments and department costs; actual, normal, and standard costs; principles of process cost accounting; principles of specific order cost accounting; manufacturing expense; selling and administrative expense; necessity for controlling accounts; voucher register; analysis sheet; cost records; stores ledger; finished parts and finished goods ledger; work in process ledger; manufacturing expense ledger; perpetual inventories; accounting for material; material storage and consumption; calculation of materials, accounting for labor costs; accounting for manufacturing expense; distribution of service department costs; distribution of manufacturing expense to production.

9bM. Cost Accounting.

This is a continuation of the first semester course in cost accounting. A part of the course consists of practice work on a set of manufacturing accounts. New principles introduced are illustrated as far as possible by the consideration of cases and problems. Some of the topics covered are: preparation of analytical cost statements; comparative statements; handling defective work and spoiled work; accounting for byproducts; containers and packing costs; interest on investment; graphic charts; estimating cost systems; standard costs; uniform cost accounting methods.

Prerequisite: Accounting 9aM or its equivalent.

11M. Advanced Accounting Problems.

In this course extensive practice is given in the solving of difficult problems. Correct analysis, proper form, and training for speed are also stressed. A study is made of the general problems of valuation of fixed assets purchased or constructed; depreciation, obsolescence, and supersession; factors of depreciation; depreciation methods; sale of depreciated assets; repairs and replacements; appraisals; depletion; nature of goodwill and methods of valuation; patents, leaseholds, and other intangible assets; temporary and permanent investments; types of securities; stock rights; classification of reserves; sinking funds; life insurance; fire insurance; the co-insurance clause. Considerable attention is given to consolidated working papers, balance sheets, and profit and loss statements.

Prerequisite: At least two years of accounting.

402M. Income Taxation.

The new Revenue Act passed by Congress in the year 1932 presents many new problems relating to the taxation of incomes. On account of the mounting governmental deficit, Congress has found it necessary to revise drastically the income tax law, and to provide increased sources of revenues.

An intensive study is made of the Federal Income Tax Act as applied to individuals, partnerships, fiduciaries, estates, trusts, and corporations. Careful consideration is given to the explanation of gross income, exempt income, net income, taxable income, and to what constitutes proper and allowable deductions for the various classes of taxpayers. Practical problems are worked out in class for all kinds of returns so that the members will become thoroughly familiar with the various phases of the income tax law. The interpretation of the different points of the law is continuously changing because of the issuance of new Treasury regulations, Board of Tax Appeals rulings, court decisions, and changes in the law itself. The course embodies the latest changes. Especial attention is given to the important problems arising under the administrative section of the law. The requirements of the law with respect to accounting procedure are also given careful consideration.

Problems arising under the Wisconsin State Income Act and its relationship to the Federal Income Tax Law will also be given careful consideration.

135M. C. P. A. Problems.

This course is designed for advanced students of accounting, and particularly those who are preparing to take the examinations for the Certified Public Accountant's license. It provides practice in meeting the conditions of the examination room where the candidate is required to work rapidly, with limited information, and often with unusual situations.

Problems and questions which have been selected from various state C. P. A. examinations are assigned at each meeting. The solving of these problems affords a review of a large portion of the field of accounting. The solutions and the accounting principles involved are quite fully discussed in class.

134M. Governmental Accounting.

The course in Governmental Accounting is intended for government officials, employees of governmental units, candidates for the C. P. A. Certificate, and others who find it necessary to have a knowledge of the general procedure of keeping the accounts of a government. It is designed to present the latest theory and practice in keeping the accounts of a governmental unit. Students entering this course should have a thorough knowledge of general accounting principles.

The subjects treated include: introduction to governmental accounts: relation of commercial and governmental accounts, funds; expendable revenue funds: definition, kinds, typical transactions; the budget: kinds of budgets, procedure, records; revenues and cash receipts: distinction between revenues and receipts, classification of revenues and receipts, recording revenues and receipts; appropriations and disbursements: making appropriations, recording

appropriations and disbursements, accounts of the Treasury; bond, assessment, and trust funds: types of bonds, accounts and records for various funds; working capital funds; stores; job accounts: the operation and accounting procedure of working capital funds, stores system and job accounts; sinking funds and property accounts: operation of sinking fund, accounting practice in relation to property accounts; consolidated balance sheets and classification of expenditures: type of balance sheets, purpose, character, and object of expenditures; accounting systems for towns and villages: discussion of systems as installed and supervised by the Wisconsin Tax Commission.

INSURANCE

800M. Casualty Insurance and Corporate Suretyship.

This course is intended for casualty and surety agents who desire further technical knowledge of the business. It is presented from the agent's viewpoint and is designed to aid him in his production and to furnish information enabling him to solicit all of the coverages which he has available. A study is made of each of the casualty and surety lines, the computation of rates, underwriting and selection of risks, and practical aids to selling and solicitation.

BUSINESS LAW

101M. General Elementary Law and Contracts.

Topics treated: legal divisions and legal terminology; definition of rights, wrongs, and remedies; the composition of American Law, English Common Law; constitutional and statutory law; the formation of contracts; legality of particular agreements; forms and evidences of contracts; performance, breach; transfer and assignment of contract; damages for breach of contract.

102M. Negotiable Instruments and Sales of Personal Property.

Negotiable Paper: Bills of exchange, promissory notes, and checks; elements essential; transfer responsibility of indorsers; protest; notice of dishonor; holders in due course; payment and discharge.

Sales of Personal Property: Contracts of sale defined; transfer of title; warranties in sales; rights of third persons; effect of acceptance on rights of buyer; remedies.

103M. Agency and Corporations.

Agency: The law of agency as fundamental to partnerships and corporations whose activities are carried on by agents and servants; law of agency as applied to principal and agent and to master and servant.

Corporations: Legal advantages and disadvantages; charter, how procured; powers and authority of corporation; duties of officers; rights, duties, and disabilities of stockholders and directors; laws of different states; foreign corporations; trusts and monopolies; dissolution of corporation.

104M. Real and Personal Property, Bankruptcy.

Law of Real and Personal Property: Estates in real property, sale, mortgage, lease; devolution of title upon death of owner, by inheritance, by will. All the phases of ownership and transfer of real property of importance to the layman are covered. Students will be expected to draft deeds of sale, mortgages, and leases.

Debtor, Creditor, and Bankruptcy: Rights of creditor against debtor and debtor's property; forms of indebtedness; methods of enforcing claim; debtor's exemptions; discharge of indebtedness; bankruptcy.

MARKETING AND ADVERTISING

500M. Salesmanship.

Everyone in business has something to sell, whether it be goods or services or ideas, and knowing how to sell is a sure way of winning success. Among the subjects covered in this course are: analysis of the article to be sold; the pre-approach; getting attention; overcoming objections; dealing with competition; appealing to buying motives; closing the sale; the personal qualifications of the salesman; organizing and working a territory.

502M. Advertising Procedure.

The subjects treated include advertising as an economic force; factors determining kind and extent of advertising; analysis of market, product, and competition; assignments in copywriting; chief psychological factors involved; buying motives; classes of advertisements; testing relative value of appeals; nature, purpose, and structural principles of various kinds of advertising copy; trade-marks; color and illustrations; typography; principles of layout: media; outdoor advertising; direct-by-mail advertising; the advertising agency; analysis and discussion of actual advertisements.

504M. Advertising Campaigns.

The economic aspects of an advertising campaign; critical analysis of copy and appeal to be used in the various stages of the campaign; case problems selected from successful campaigns, both newspaper and magazine, local and national in scope; direct and mail-order advertising; the place of house organs and dealers' aids in the campaign; color and illustration; and determining the advertising appropriation are studied in this course. Members of the class are required to work out a complete campaign involving selection of sales outlets, choice of media, buying of space, ordering of illustrations and engravings, and all other details connected with a complete campaign. Reference is made to current advertising literature.

506M. Managing a Sales Force.

Sales planning, sales operation, and sales control are receiving more and more attention during this period of adjustment. This course covers the

work of the sales manager; the organization of the sales department; recruiting, selecting, training, equipping, and paying salesmen; methods of stimulating salesmen, including letters, house organs, bonuses, contests, and conventions; planning sales operations, including setting quotas, mapping territories, and routing salesmen; controlling sales operations, through reports and records; and co-ordinating sales and advertising.

The course is intended for sales managers, assistant sales managers, and salesmen who are preparing themselves for increased responsibilities.

507M. Retail Store Management.

The rapid changes which are taking place in the field of retailing make it absolutely necessary that the independent merchant in the relatively small store know more about his business than ever before. He must know what to watch, how to control the merchandising activities in his store, by what methods he can make sure of operating his store at a profit. This course is organized with those purposes in view. It does not include the complicated methods of large store operation. It shows how small stores can use good merchandising methods without increasing costs. Among the subjects discussed are: layout display; mark-up expense control; avoiding wastes; advertising; salesmanship; credits and collections; meeting competition.

Each member of the group has an opportunity to work out the problems which affect his own organization. In this way, as well as through the group discussions, he gets definite, practical help from the course.

508M. Sales Policies.

What are the major sales problems of firms producing goods for the consumer market, and what strategy do they use in solving these problems? These questions are discussed in detail, special attention being given to such practical problems as selling to wholesalers vs. selling direct to retailers; hand-to-mouth buying; using missionary salesmen; sampling; selling to chains and other large-scale retailers; selective selling and exclusive agencies; selling direct to consumers; fashion cycles; unfair competition; analyzing a market; service policies; price policies; price-cutting and price-maintenance; co-operating with distributors and dealers.

The course is intended primarily for sales managers and their assistants, ambitious salesmen, advertising men, and credit men.

BUSINESS ENGLISH AND BUSINESS CORRESPONDENCE

700M. Business English.

This course is designed for business people who desire to improve their knowledge of spoken and written English. Salesmen, stenographers, office people, and those generally who are engaged in business find the course useful in the cultivation of accuracy of expression. It includes the study of the fundamental rules governing correct expression, sentence structure, paragraph structure, common grammatical errors, the use and abuse of slang, and the

form and composition of a good business letter. For those who desire to specialize in the particular application of English to business transactions, the course serves as a necessary introduction to the more advanced course in Business Correspondence.

702M. Business Correspondence.

Writing effective business letters requires the use of good English and good judgment. This course trains the student to write more clearly, concisely, correctly, and forcefully. It also explains the strategy that is needed in each important type of business letter. What to say is emphasized as much as how to say it.

The course is designed for dictators, secretaries, stenographers, and, in general, for those who wish to progress toward responsible correspondence positions. It is a logical sequel to the course in Business English.

Actual business letters are analyzed, and practice is given in writing routine letters, adjustment letters, credit and collection letters, sales letters, and letters to salesmen. Attention is paid, also, to giving the letter an attractive, modern appearance.

FINANCE AND CREDIT

137M. Business Finance.

A study is made of the method of financing a going concern by the issue of stocks, bonds, short time notes, and the use of bank loans. From this point, inquiry proceeds into the financial problems of promotion, combination, merger, insolvency, receivership, and dissolution. An attempt is made to outline safeguards against financial losses including insurance and accounting control, and to analyze causes of business failure and methods of reorganization.

401M. Credit and Collections.

Credit can safely be granted to a firm only on the basis of exact information about the condition of its business. The facts needed can be obtained from financial statements, the credit rating books, special reports, and in other ways, all of which are thoroughly covered in this course. Methods used by credit men in analyzing balance sheets and profit and loss statements are studied intensively, the major part of the course being devoted to this subject. Credit insurance, credit letters, and credit office routine are also examined, but in less detail.

In the study of collections, these topics are covered: causes of delinquent accounts, collection methods, collection letters, the collection agency, and the adjustment bureau. Emphasis is laid upon getting the money without losing the customer.

403aM. Investments.

The principal objective of this course is to equip the student with certain principles which will aid him in the investing of his own funds or the

funds of others. The work begins with an outline of economic fundamentals as applied to the field of investments. Standards are developed by which securities may be measured, and application of these standards is made to the formulation of an investment policy for the individual, for the corporation, and for the institution. Individual securities are examined in the light of these principles, and typical investment accounts are constructed. Since the scope of the course is general, only a minimum amount of time is given to the interpretation of balance sheet and profit and loss statements. A more complete and detailed financial analysis is reserved for the advanced course.

403bM. Investments. (Advanced Course).

This more advanced course is designed for those who have a foundation in the fundamental concepts of investing. The problem of the successful commitment of funds is approached from two different angles. In the first place, a study is made of the methods by which balance sheets and profit and loss statements are analyzed with respect to investment merit. Individual statement items are analyzed and compared; attention is directed to the meaning of various ratios and trends; and inquiry is made into the existence of and the methods of estimation of hidden assets.

In line with the second objective of the course, a study is made of the various industries with respect to the opportunities presented for a profitable return on funds. A survey of the advance and recession of investment advantages in certain fields is followed by an inquiry into the present major activities in production and distribution, and an attempt is made to outline the favorable and unfavorable factors for a half-dozen or more of the leading industries of the United States.

Corporation Management, see page 42.

Business Statistics, see page 42.

INDUSTRIAL MANAGEMENT

601M. Factory Management.

The factory executive's task has been aptly defined as "delivering the product that is wanted, when it is wanted, at a minimum cost of production." To accomplish this task successfully he must adopt modern methods of planning, operation, and control.

The following topics are, therefore, covered in this course: the internal organization of a manufacturing concern; locating, equipping, and laying out the plant; providing proper light, heat, and ventilation; system and symbolization; production control, including planning, routing, scheduling, and dispatching work through the factory; quality control (inspection); making time and motion studies; maintenance work; material control; purchasing, receiving, storing, and issuing material; inventory control; salvaging; simplification and standardization in manufacturing; relations between the planning and cost departments.

Cost Accounting 9aM and 9bM, see page 46.

SECRETARIAL WORK

714M. Secretarial Training.

The duties required of a secretary to the business and professional man are outlined. Instruction is given in the performance of such duties, together with practical projects and assignments selected to train the student in the basic principles of business associated with secretarial work. The course is planned to assist stenographers and officer workers who desire to advance into secretarial work; to give secretaries additional experience in handling varied executive duties; and to acquaint anyone interested in secretarial work with the fundamentals of secretarial practice.

The subjects treated in this course are: secretarial education requirements; essential mental, moral, and physical qualities; the "time" element; handling and interviewing callers; making and supervising appointments; diaries and recording books; clerical duties of the secretary; organizing dictation and transcription; postal information; mailing procedure; the technique of telephoning; a study of important reference books; office appliances; editing dictated matter.

Shorthand and typewriting are not taught in this course.

715M. Advanced Secretarial Training.

The advanced course in Secretarial Training includes continued discussions and presentation of the theory and fundamental principles of secretarial work. Criticism and advice in individual problems are given. The greater part of the course is devoted to dictation projects including the following: summarizing correspondence and reports; civil service information; the technique of filing and indexing; source material for employer's speeches; constructing interesting letters from employer's "hints" or notes; a thorough mastery of technical business terms from both a vocabulary and dictation standpoint; shorthand dictation with typewritten transcripts of letters, reports, statistical data, and artistic display-work. The dictation presented covers a training course in stenographic practice and secretarial procedure in representative lines of business in Milwaukee.

Prerequisite: Secretarial Training 714M or consent of instructor.

REAL ESTATE

306M. Fundamentals of Real Estate Practice.

Real estate values compose nearly half of our national wealth. They are constantly changing, as they are affected by population growth, industrial development, and environment. This is the first course of the program of real estate education sponsored by the Milwaukee Real Estate Board and the National Association of Real Estate Boards.

The discussion includes the following topics: the real estate market; the value of real estate; apartments and business structures; industrial property; city planning; forecasting city growth; finding property and prospects; financing real estate transactions; building and loan associations; mortgages; real estate brokerage; managing a real estate office.

307M. Real Estate Law.

Real Estate Law is of particular value to the real estate man inasmuch as it forms such a basic part of real estate activity. A careful analysis of the deed, for instance, and a discussion of all its elements provides an indispensable familiarity with the topic. A treatment of mortgages in the same manner provides information equally valuable. The course discusses such fundamental legal subjects as deeds, mortgages, leases, fire insurance, listing contracts, sales agreements, and agency relations. It concludes with an explanation of different kinds of interest in real property and a discussion of the abstract.

308M. Real Estate Transfers and Conveyancing.

Much of the work of transferring real property follows the unwritten law. Consequently, exercises in the actual making of transfers and conveyances are of the greatest value to the real estate man. This course consists principally of actual work in drawing up instruments of conveyancing, particularly various kinds of deeds and mortgages and long-time and ordinary leases. Action to quiet title is followed through carefully, and the required instruments are drawn. Methods of terminating leases by written notice and unlawful detainer also receive complete treatment. A discussion of government land titles, government patents, and the U. S. Geological Survey concludes the work.

Real Estate Law must be taken before Transfers and Conveyancing by those who wish credit toward a Real Estate Board Certificate.

309M. Real Estate Financing.

Success in the real estate business is largely dependent upon the skill with which transactions are financed. Automobiles, radios, furniture, and many other things that are sold on easy payments take a large share of the income of the average American family. To an increasing extent these goods are competing directly with real estate. Consequently, in almost every real estate deal credit is a vital factor.

This course is especially useful to real estate brokers and salesmen; to officers and employees of banks, investment houses, mortgage companies, and building and loan associations. It includes practical information on the financing of homes, small stores, industrial sites, office buildings, subdivisions, and apartment houses, including co-operative apartments; the sources of funds for real estate loans; sound appraisal methods; choosing of profitable sites; financial houses furnishing real estate funds, their requirements, organization, and methods of operation; forms of real estate credit; mortgages, land contracts, bond issues, and participation certificates; ground rent systems and long-term leases; and the part played by building and loan associations in financing home ownership.

310M. Real Estate Appraisals.

Correct appraisals are not only fundamental but very essential to success in the real estate business. This course emphasizes the economic theory of scientific appraising as well as its practical application to every form of real estate appraisal.

These topics are discussed: economics of value; economic foundation of real estate value; elements of real estate value; income and real estate value; appraisal procedure and methods; computation of new income; appraisal of income property; appraisal of lease equities; depreciation and obsolescense; comparative value analysis; appraisal reports; and appraisal ethics. Hypothetical as well as actual appraisals of Milwaukee property are made by the class. At least one long form appraisal report is written by each student.

311M. Real Estate Selling.

Real estate selling is no longer a haphazard process. It has become a scientific procedure. The salesman must be prepared to sell the service of the realtor and of his own organization. He must be able to analyze the realty he is to sell and the market for it. He must be able to carry out his firm's selling policies and to cooperate with its advertising. Finally, he must understand the actual steps in making a sale. In covering these subjects, this course helps not only the salesman to make sales, but it also aids him in progressing toward sales management and eventually a business of his own.

312M. Property Management.

The task of the property manager is to get the greatest possible return from property by putting it to the best possible use. As a merchandiser of space he will first study the possibilities of a location, whether the ground floor space, for example, is most suitable for a restaurant, a drug store, or a men's clothing store. Having determined what the building is most logically suited for, he will develop a renting campaign to secure tenants. He is, also, of course, concerned with securing new tenants when vacancies occur.

The present day building manager is informed about the characteristic features of office buildings, apartment houses, stores, lofts, and other types of income-producing property. He knows how to make suitable arrangements of floor space and how to provide proper light, heat, and ventilation. He knows what type of service his tenants need and expect. He is familiar with the most efficient maintenance methods and with the less complicated, but important, tasks of collecting rents, keeping accounts, and directing a clerical staff.

All of these activities are fully discussed in this course, which has been developed to meet the needs of those who have property management problems, including real estate men, building managers, officers of banks, trust companies, and insurance companies, lawyers who have been charged with the management of estates, and large property managers.

ENGINEERING AND TECHNICAL SUBJECTS

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule which will be issued each semester. Courses marked with an asterisk (*) involve credit toward a university degree.

AERONAUTICS

Areo. 1. Aeronautics, Elementary.

This course offers an introduction to the fundamental principles of flight and aerodynamics. A study is made of the characteristics of airfoils, streamlining, parasite resistance, airplane performance, and the newer developments such as the autogyro, wing slots, floating ailerons, etc.

Problem work involved in the design and selection of airplane components constitutes a large portion of the course in conjunction with class discussion.

Prospective students should preferably have training in algebra and physics equivalent to high school graduation. The course is recommended to those who want accurate information relative to the theory of operation of the modern airplane. Pilots will find this course and the following excellent preparation for the Department of Commerce examination on Airplanes.

Aero. 2. Aircraft Construction.

A study is made of types of construction of wings, fuselages, propellers, and landing gears. The materials used for this work will be gone into, and the student will be given an opportunity to fabricate sample ribs, fittings, welded joints, and wire and tie rod connections. Arrangements have been made with Milwaukee flight organizations to permit the class to inspect dismantled planes and assist in their alignment.

Aero. 3. Airplane Engine Theory and Details.

The principles of the internal combustion engine as applied to aircraft engines are studied together with reasons for modern engine arrangement. Carburetion, ignition, fuels, lubricants, supercharging, and factors influencing weight, power, fuel economy, and reliability are studied.

Aero. 4. Airplane Engine Maintenance.

Practice is given in the checking, overhauling, and maintenance of modern engines. Methods of trouble shooting are given which should enable a student to do maintenance work on his own airplane engine or to gain experience toward obtaining an engine mechanic's license.

Aero. 5. Aviation Law and Insurance.

Technical and legal problems involved in the operation of flying schools, airlines, and air mail routes are studied, together with functioning of the Aeronautics Branch of the Department of Commerce. Air traffic rules, boundary and customs regulations, insurance, public liability, and property damage are also covered.

Aero. 6. Cost Accounting in Aviation.

Cost accounting as applied to airplanes, airports, airways, and equipment is taken up in this course. Work is given in depreciation problems, replacement policies, and repair and maintenance budgets.

Aero. 7. Meteorology and Air Navigation.

A study of the weather and factors influencing it is made, followed by an investigation of the magnetic compass and dead reckoning navigation. Aircraft instruments and radio are also studied. This course is particularly recommended to pilots who wish to prepare for the transport pilot's examination.

Aero. 8. Special Problems in Aero Engineering.

In this course work is taken up which will be of the most benefit to the student in the work he is engaged in. The following are suggested as suitable problems: simplified propeller design; certain aspects of stress analysis; prediction of performance; selection and combination of propeller, engine, and airplane for various operations.

Aero. 9. Drafting in Aero Engineering.

A study is made of the graphical methods employed in stress analysis, together with propeller layout and general aircraft drafting.

This course is to be taken in conjunction with the course in Special Problems.

ARCHITECTURAL AND BUILDING

1aM. Architectural Design.

Design, in so far as it should indicate the character of the building, whether political, religious, or domestic, is taken up in this course. Good design requires grace of form, articulation of parts, proportion and emphasis, these qualities all being dependent upon outline, mass, color, and detail. It comprises the use of both Greek and Roman Periods and the Periods that follow, in conjunction with building design.

The following subjects are taken up: plan and elevation development—monumental, commercial, and residential; interior design in the various periods; application of moldings, decoration, color schemes; furniture designs in rooms of a given period; esquisse-esquisse problems and development; color presentation drawings; criticism on problems with chalk talks.

1bM. Architectural Design.

Course 1b is a continuation of the first semester's work. It is open to new students who are properly prepared.

Prerequisite: Course 1aM or its equivalent.

243aM. Architectural Drawing.

Besides covering the subject of drawing as applied to architectural work, this course gives valuable information on details of building construction and general practice as carried on in an architect's office. It takes up first the principles of drawing, illustrating the most important methods used in architectural work. Some time is spent on architectural lettering, on abbreviations used in architecture, and on schedules of materials which are so essential for the complete understanding of working drawings.

The student is given practice in drawing various details of a moderate sized house. These drawings include sections through frame walls, brick or stone veneer walls, and tile with brick or stone veneer. Various types of windows, including basement windows, casement windows, inswinging and outswinging windows, and check-rail windows, are detailed. Floor construction for tile or wood finished floors. is also included in this course.

243bM. Architectural Drawing.

In the second semester the student is required to make drawings of a small house beginning with sketch plans and elevations at ⅛ inch scale. Special attention is given to the proper presentation of these drawings. Working drawings of plans and elevations are then made at ¼ inch scale followed by ½ inch scale drawings of stairway, fireplace, cabinets, and the full-sized details that are required to complete the house.

The course takes the student through the design of a specified residence from the start. Blackboard drawings are made, and lectures are given by the instructor at each class meeting as well as personal criticism of each student's work.

Prerequisite: Course 243aM or its equivalent.

497aM. Estimating for Builders.

The practical methods of estimating used by builders and contractors are taught in this course. Instruction is given in the reading of blueprints and designs as well as in the fundamentals of arithmetic. Plans for small buildings are furnished, and the student carries through a systematic estimate of all material and labor quantities. He is instructed to use judgment in estimating the quantities of brick, lumber, glass; to make proper allowance for unavoidable waste in construction; to analyze cost data for similar work and arrive at certain unit costs; to make the proper tabulations, addition, and multiplication in order to arrive at the direct cost.

497bM. Estimating for Builders.

This subject is treated from the standpoint of the builder and contractor. The student should have ability to read plans or blueprints and have a fair knowledge of building operations. The course is confined to reasonably large buildings of reinforced concrete, steel, and wood (mill-type construction). A complete set of blueprints, together with the specification of some large building in Milwaukee, is acquired by the student. The work of the semester

is directed to the preparation of quantity surveys and estimate of the labor required for the different types of construction. This course is a continuation of Course 497aM. It is open to new students who are sufficiently prepared. The course in Architectural Drawing is of value if taken during the same semester.

Prerequisite: Course 497aM or its equivalent.

Heating and Ventilating, see page 64.

CHEMISTRY

2a. General Chemistry.* **4 credits.**

Two hours lecture; two hours recitation; four hours laboratory. Lab. fee and deposit, $15.

This course is designed to offer a broad foundation in the chemical and related sciences. The properties and reactions of non-metals, acids, bases, and salts are studied with special emphasis on the fundamental laws and theories.

2b. General Chemistry.* **4 credits.**

Two hours lecture; two hours recitation; four hours laboratory. Lab. fee and deposit, $15.

A study is made of the inorganic chemistry and qualitative analysis of the common elements. Special emphasis is given to the principles underlying the analytical procedures.

Prerequisite: Chemistry 2a.

14. Quantitative Analysis.* **3-5 credits.**

Three or four credits, lab. fee and deposit, $20; five credits, lab. fee and deposit, $25.

Chemistry 14 is a course in the essentials of quantitative analysis. The student analyzes naturally occurring ores and commercial materials.

Prerequisite: General Chemistry, including qualitative analysis.

DRAWING

Architectural Drawing, see page 58.

1. Elements of Mechanical Drawing.* **3 credits.**

Laboratory fee, 50 cents.

Topics treated: theory of orthographic projection; reading problems; freehand sketching; working drawings; vertical lettering; tracing.

2. Elements of Mechanical Drawing.* **3 credits.**

Laboratory fee, 50 cents.

Topics treated: problems involving the conventional drawing of machine elements; graphical charts; sketches of machine parts, followed by

detail and assembly drawing and tracings; slant lettering; blue printing; isometric drawing; standard drafting room practice.

Prerequisite: Drawing 1.

(Courses 1 and 2 may be elected for credit by students in the College of Letters and Science.)

3. Descriptive Geometry.* **3 credits.**

Topics treated: fundamental theory of point, line, and plane, with application to solids; generation and classification of lines and surfaces; tangent planes; sections; intersections and developments.

Prerequisite: Drawing 2.

ELECTRICAL

348M. Symmetrical Components and Their Applications to the Solution of Alternating Current Problems.

This course of lectures covers a discussion of the following: unbalanced electrical circuits and solutions involving single phase and polyphase faults; methods of calculating the magnitudes of currents and voltages for short circuit from one line to neutral, from two lines to neutral, from line to line, and all three phases; the generating or other apparatus connected to the system; means of correcting unbalance with phase balancers; such special applications as induction motors with unbalanced primary voltages; and stability of systems of distribution.

The general method of treatment is to break an unsymmetrical polyphase system into two balanced, or symmetrical, systems, of opposite phase sequence, and a third system of zero phase sequence. That these are more than mathematical fictions and have physical significance is made clear in the early part of the course. The theory of complex numbers and their applications to the solution of balanced system is first reviewed for the benefit of those who have forgotten parts of that method.

Prerequisite: Graduation from an engineering college or substantial equivalent.

MACHINE DESIGN

1. Machine Design* (Mechanism). **4 credits.**

Among the topics treated are: motion and velocities, instantaneous centers, relative linear velocities, velocity diagrams, cams, gearing, and belting.

Prerequisite: Mechanical Drawing, 1 and 2.

2. Machine Design Practice.* **1 credit.**

This is a short course treating of the practical considerations of machine design. Study is made of the use and application in design of engineering material, formulae, and tabulated data, together with a discussion of factor of safety and allowable stress.

Prerequisite: Machine Design 1.

208M. Mechanism.

Mechanism is the study of the motion of the parts of a machine and is sometimes called "the geometry of machinery." Only such mechanisms will be studied as are of practical application. Mechanics, strength of materials, and machine practice will be introduced only so far as is necessary to the thorough understanding of the mechanism studied.

The subjects studied include linkages, cams, gears, belts, wrapping connectors, and intermittent motions.

Since much careful drawing is required in the course, a good set of drawing instruments is necessary.

Prerequisites: Drawing and Algebra and Trigonometry or their equivalent.

209aM. Machine Design.

The principles of mechanics, mechanism, and strength of materials in the design of machine parts are studied in this course.

Introducing the subject, such topics as materials, loads, stresses, factor of safety, elastic limit, modulus of elasticity, and moment of inertia are studied. Typical elements of machines used as examples in applying principles are: beams; columns; rivets and riveted joints; screws and bolts; keys; lubricating devices; bearings; belt and rope drives; toothed gearing; friction clutches and brakes; shafting; springs; cylinders; and plates.

Prerequisite: Mechanics 206M or equivalent.

209bM. Machine Design.

The work of this course is based upon the instruction given in Course 209aM as a prerequisite. Students who have not completed Course 209aM but who have had other machine design instruction may enroll for Course 209bM with the permission of the instructor.

The subject matter of the course, based upon a recent outstanding machine design text, covers the following general topics: design of shafting under various conditions of loading, concentration of stress in fillets, and fatigue of metals due to varying stresses; strength of spur, bevel, and worm gears; friction brakes, friction clutches, friction wheels, belt drives, and rope drives; design of machine frames for strength and rigidity; design of flywheels for inertia, capacity, and strength; stresses in thick cylinders; stresses due to force fits; a brief consideration of static and inertia forces in connection with rotating and reciprocating machine parts; safety engineering in design.

A selection of suitable problems accompanies the above theory.

212a-bM. Elementary Engineering Problems (algebra and trigonometry) See page 62.

213a-bM. Advanced Engineering Problems (analytics and calculus) See page 62.

MATHEMATICS AND ASTRONOMY

212a-bM. Elementary Engineering Problems (algebra and trigonometry).

The purpose of this course is twofold:

First, to provide practice in analyzing simple problems of an engineering nature.

Second, to provide the foundation of elementary mathematics required for the solution of such problems.

The mathematics used is elementary algebra, geometry, and trigonometry. The problems for analysis and solution are of the type frequently met in surveying, in machinery operation, in heating and ventilating, in refrigeration, and in the design of simple structures and machines. The importance of the habitual use of clear-cut sketches as the basis of analysis is emphasized. Orderly and accurate written solutions are required. Constant use of the slide rule is an essential of the course.

The course is suitable as a review in elementary mathematics and as a preparation for almost all of the subjects of the certificate courses offered by the Engineering Department.

Prerequisite: Working knowledge of elementary algebra.

213a-bM. Advanced Engineering Problems (analytics and calculus).

This course is planned to meet the needs of draftsmen and designers who desire a reading and working knowledge of mathematics beyond their present foundation of algebra and trigonometry. Most familiar handbook formulas in daily use are based on comparatively simple physical laws. In developing these principles and putting them into working form, methods of analysis and reasoning common to higher mathematics are made use of.

It is the purpose of this course to combine the processes of mathematics and the materials of familiar engineering problems in a series of practical procedures from physical principles to handbook formulas.

Prerequisites: Elementary Engineering Problems 212M, Mechanics 206M, Strength of Materials 207M, or their equivalent.

50. Subfreshman Algebra. **No credit.**

The topics covered include square root, quadratic surds, solutions of quadratic equations, simultaneous equations involving quadratics, logarithms, progressions, and the binomial theorem. The course is required of all students who do not pass the examination given to all freshman engineers.

51. Elementary Mathematical Analysis.* **5 credits.**

This course is required of all freshmen in engineernig. Applicants for admission will be required to pass an examination in algebra, given shortly after the opening of the semester.

The course includes: functions; rectangular coordinates and the straight line; the power functions; the circle and the circular functions; ellipse; hyperbola; single and simultaneous equations; permutations and combinations;

binomial theorem; progressions. A thorough review is given at the close. The course gives prominence to the fundamental truths of elementary analysis. Graphing is emphasized.

52. Elementary Mathematical Analysis.* **5 credits.**

Course 52, Elementary Mathematical Analysis, is regularly required of all freshmen in Engineering and is a continuation of Mathematics 51. The course covers: logarithmic and exponential functions with applications; trigonometric equations and the solution of triangles; simple harmonic motion and waves; complex numbers; locus problems; and a brief course in conic sections.

Prerequisite: Mathematics 51.

54. Differential and Integral Calculus.* **4 credits.**

All Engineering sophomores are required to take this course.

Content of course: review of functions and processes taken up in Mathematics 51 and 52; the derivative, its meaning and application; limits; the power function; differentiation of algebraic functions; second derivative applications; infinitesimals; definite integrals; circular functions; inverse circular functions; exponential and logarithmic functions; maxima and minima; polars; integration.

Prerequisite: Mathematics 51 and 52 or their equivalent.

55. Integral Calculus.* **4 credits.**

This course is required of all sophomore engineers and is a continuation of Mathematics 54.

Content of course: advanced integration; successive integration; center of gravity; moment of inertia; curvature; series; total derivatives; exact differentials and a brief introduction to differential equations.

Prerequisite: Mathematics 51, 52, 54, or their equivalent.

Note: Mathematics 54 and 55 may be taken by Letters and Science students instead of Mathematics 5.

Astronomy

6. Navigation.* **2 credits**

This course is designed for students who wish an elementary course in Practical Astronomy or who wish to become familiar with the methods by which the position of a ship at sea is determined. Some of the subjects taken up are: instruments used in navigation; latitude by Polaris; latitude by a meridian altitude of the sun; azimuth; longitude by a time sight of the sun or a star; the method of Marc St. Hilaire; the line of position; and modern methods in practical navigation.

Prerequisite: Trigonometry.

MECHANICAL AND INDUSTRIAL

223aM. Heating and Ventilating.

This course is offered, primarily, for architects, architectural draftsmen, engineers, contractors, estimators, and others who feel the need of a practical course which will help them to plan, estimate, and install heating and ventilating systems in the various types of buildings. It is, however, of value to anyone interested in heating and ventilating problems.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics and the ability to use simple formulas are required. Much time and work will be saved if the student is able to use the slide rule.

Topics treated: heat, temperature, specific heat, expansion of solids, liquids, and gases; heat loss from buildings, radiation, conduction, convection, infiltration, exposure factors, coefficients of heat transmission; heat loss calculations, comparison of rules and methods for figuring heat losses; different methods of heating, advantages and disadvantages of the different methods; warm air furnace heating, fan furnace systems, furnace ratings, pipeless furnace, calculations and design, factors affecting installation and operation, recirculation system, combined heating and ventilation systems as applied to residences and other types of buildings; properties of steam, pressure, evaporation, steam tables, heat of the liquid, latent heat, total heat of steam, specific volume and density; radiators, coefficient of heat transmission, painting, material, location, methods of calculation, indirect and direct-indirect radiators; boilers, classification, types, ratings, selection, safety and economy; steam heating systems, vapor, air line and vacuum; pipe fittings, valves and accessories, commercial pipe, fittings, valves and insulation; flow of steam in pipes and pipe sizing, sizing of piping for the different types of steam heating systems.

223bM. Heating and Ventilating.

This is a continuation of the first course in Heating and Ventilating

Topics treated: hot water heating, heat loss and radiation, temperature of water, hot water boilers, gravity, pressure, and forced circulation systems; hot water piping, general details of piping, the area method of pipe sizing, pipe sizing for closed tank systems, Honeywell, D and T, Thrush and Mueller system, size of valves, mains and risers, basement radiators, branch connections, separate returns; problems in steam heat design, heat losses, radiation, pipe and valve sizes and plan; problems in hot water heat design, heat losses, radiation, pipe and valve sizes and plan, central station or district heating systems, general information on these types of systems; temperature and humidity, general information and methods of control, types of apparatus, and applications; air and its properties and ventilation; study of the conditions of the air and application to ventilating systems; fans systems, as used for heating and ventilating, fans, heating and tempering coils, Vento heaters, humidity and temperature control, air washers, cold and warm air ducts, unit heating systems; problems in design of fan systems, heat loss, direct radiation, Vento radiation, size of fan, ducts; plans and specifications; piping; pipe sizes, fittings,

valves, air valves, insulation, testing of system; fuels and combustion, coal, oil, gas, and their use in heating systems.

Prerequisite: Course 223aM or equivalent.

222M. Refrigeration.

This is an elementary course and is planned for a thorough study of the fundamental principles of refrigeration. For the student who has had no instruction or experience in refrigeration it provides a good foundation for advanced study. The course should also prove interesting to those who feel the need of a review of the fundamental principles of refrigeration.

The work is based on a standard text which may be purchased through the Extension Division. Mimeographed material used in the course is supplied by the Extension Division.

The work of the course contains many calculations and, therefore, a good knowledge of elementary mathematics and the ability to use simple formulas are required. If the student can use the slide rule, he can save much time in making the many calculations involved.

A general statement of the topics treated follows: mechanical and electrical units; heat; change of state; heat involved in the process of refrigeration and unit of refrigeration; principles of mechanical refrigeration; properties of refrigerants; complete compression machine, details of compression machine, and operation of compression machine; direct and indirect refrigeration; absorption system of refrigeration and properties of aqua ammonia; the complete absorption system and its operation; ice-making; economics of refrigeration; insulation; cold storage construction; air circulation and piping of cold storage rooms; cold storage of dairy and other products; automatic or household refrigeration machines.

224M. Mechanical Equipment of Buildings.

In the design and construction of the modern building there is involved the selection and installation of various types of mechanical equipment.

Under the present methods of construction each trade installs its particular type of equipment, its general knowledge of all types of mechanical equipment being rather meager.

This course is planned so that the student who is interested in building construction and the selection and installation of mechanical equipment may have an opportunity to study and discuss the various types of equipment so necessary to the successful completion of the modern building.

The work is based on a standard text which may be purchased through the Extension Division. Mimeographed material used in the course is supplied by the Extension Division.

The following outline gives a general idea as to the topics treated in this course: the different types of heating systems and their application to particular types of buildings; the small power plant for a building; selection of boilers, ash and coal handling machinery, automatic instruments, chimneys, and oil burners; refrigeration machinery; plumbing and plumbing aids;

elevators; electric equipment, involving conduit, wiring, motors, and lighting systems; vacuum cleaners; pumps; laundry and kitchen equipment.

All of the above topics have many subdivisions which are considered during the course.

MECHANICS AND MATERIALS

1. Statics.* First half semester. **3 credits.**

Prerequisite: Physics 51.

2. Dynamics.* Second half semester. **2 credits.**

Prerequisite: Mechanics 1, enrollment in or completion of Mathematics 55.

206aM. Elementary Mechanics. (Statics).

Through the course in statics the student acquires a knowledge of the fundamental facts and theories as well as the ability to apply this knowledge to practical problems. The course is of value to the shopman, draftsman, and designer. It must be completed before any of the design courses are taken up. The application of forces to cranes, derricks, and trusses is covered both graphically and analytically.

Among the topics treated are: concurrent forces; equilibrium; resultant and components; non-coplanar forces; types of trusses; loadings; and friction.

Prerequisites: Algebra and trigonometry.

206bM. Elementary Mechanics. (Dynamics and Properties of Materials).

This is a continuation of Course 206aM given in the first semester. The subjects studied in this course are: motion and forces that produce changes in motion; moment of inertia; radius of gyration; work; power; energy; friction; general laws of machines; elasticity and its relation to the strength of beams, columns, and shafts. Consideration of all these subjects as they arise in different aspects in design will be given in the solution of many practical problems.

Prerequisite: Course 206aM or equivalent.

207M. Strength of Materials.

Course 207M is intended for those who aspire to be machine designers or structural or architectural draftsmen. The student should have a good working knowledge of arithmetic, elementary algebra, and the rudiments of trigonometry. He should be familiar with the use of the slide rule and have one of the standard steel handbooks for reference.

Topics treated: properties of materials; simple stresses; elastic properties; cylinders, pipes, and riveted joints; center of gravity and moment of inertia; beams, reactions; shear; bending moments; columns; general reference tables.

Prerequisite: Algebra.

PHYSICS

51. General Physics.* **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

Mechanics, heat, magnetism, and static electricity are taken up in this course. The course is required of civil, mechanical, and chemical engineers.

Prerequisite: Students must have completed or be taking Mathematics 52.

Physics Laboratory

52. General Physics.* **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

Current electricity, sound, and light are treated in this course. The course is required of civil, mechanical, and chemical engineers.

Prerequisite: Physics 51 and Mathematics 54 or concurrent registration in Mathematics 54.

For information about Physics Exhibition, see page 14.

RADIO

6M. Current Radio Developments and Vacuum Tube Applications.

This course is designed for students who are familiar with the fundamental principles of electricity and have a good working knowledge of the principles of radio communication, but who wish an opportunity to familiarize themselves with the more recent developments in radio as well as gain a knowledge of the workings of the vacuum tube and its application to industry.

During the first ten weeks of the course half of each lecture is devoted to the study of the fundamental principles and laws of the thermionic vacuum tube, the photo-electric cell, and the neon tube. The other half of the lecture is devoted to the industrial applications of the vacuum tube. This is to assist the engineer in taking advantage of this new universal tool for his own field and adaptations.

During the last seven weeks the entire lecture covers the applications of the tube and current radio developments, reviewed from new books, bulletins, and magazines. The aim is to make the work practical by closely studying present day tendencies in new tubes, circuits, and apparatus.

The subject is presented by lectures and demonstrations. Ample opportunity is given for class discussion and the presentation of particular problems by members of the group. The course is open to a limited number of college graduates and practicing engineers.

7M. Principles of Radio Communication.

Over a two-year period this course covers the theory and practical applications of radio telegraphy and telephony, together with correlated subjects necessary for a thorough understanding of the radio craft. Lectures, demonstrations, problems, and class discussion cover the fundamentals involved.

8M. Laboratory Practice in Radio Communication.

The experiments follow the topics covered in the lectures and emphasize the application of the principles discussed in class. This course can not be taken without registration in the lecture course.

9M. International Morse Code.

Drill in sending and receiving up to 22 words a minute is completed in this course over a period of two years, together with adequate training in message forms, "Q" signals, traffic handling, and government regulations.

A modification of the regular first year day course may be taken three evenings a week over a period of two years.

For information about full-time day classes in Radio, see page 109.

RAILWAY ENGINEERING

1. Railway Curves.* **2 credits.**

The computation and field location of simple, compound, and spiral curves, and of railway turnouts are covered in this course.

Prerequisite: Trigonometry and Elementary Surveying.

STRUCTURAL

422aM. Steel Design and Details.

In this course the fundamentals covered in structural theory are applied to the actual design of a structure.

During the semester the student designs a mill building. The design covers the roofing, purlins, trusses, columns, footings, walls, bracing, and crane runway. Design drawings, details of joints and connections, and weights of various parts are computed. Window and door openings are treated in connection with the corrugated iron covering for the walls.

Civil Engineers

422bM. Steel Design and Details.

The student at first becomes familiar with the design of beams under moving loads and impact. He then makes a complete design of a highway bridge girder and later a design of a highway bridge truss.

Prerequisite: Courses 450aM and 450bM or their equivalent.

450aM. Structural Theory. (Statics)

For description, see Statics 206aM, page 66.

450bM. Structural Theory. (Strength of Materials)

For description, see Strength of Materials, 207M, page 66.

SURVEYING, SEE TOPOGRAPHIC ENGINEERING

TOPOGRAPHIC ENGINEERING

(See Also Railway Engineering, page 68.)

1. Elementary Surveying.* **2 credits.**

Lab. fee, $4.50.

The theory and practice of pacing, taping, and leveling are studied in this course.

2. Elementary Surveying.* **2 credits.**

Lab. fee, $4.50.

Classroom work and field practice in the use and adjustment of the engineer's levels, surveyor's compass, and transit are dealt with in this course.

Prerequisite: Course 1.

3. Land Surveying.* **3 credits.**

Lab. fee, $3.

Content of Course: theory and field practice in the use of transit, sextant, and plane table, in problems relating to land surveying; the effect of lack of adjustments; instrumental inaccuracies and their elimination; methods used in original land surveys, city surveys, and resurveys. The field work is followed by office practice in computations arising from common surveying problems, in plotting field notes, and in making maps.

Prerequisite: Course 2 and Trigonometry.

104. Advanced Surveying.* **3 credits.**

Lab. fee, $4.50.

The following topics are taken up: mining, topographic, and hydrographic surveying, stream gaging, and field astronomy; field practice in solar and stellar observations, topographic surveying, and mapping. (Completion of this course admits the student to the University of Wisconsin Summer Survey Camp.)

Prerequisite: Course 3.

108. Short Course in Surveying.* **3 credits.**

Lab. fee, $4.50.

This course is planned to meet the needs of students in mechanical and electrical engineering for a general study of surveying. It may also be taken by students in mining engineering and some other courses. It includes topographic, hydrographic, and land surveying, with field practice in the use of tape, level, and transit.

410M. Surveying.

Lab. fee, $2.25. (For students in the two-year course in Building Design and Construction.)

The first half of the semester is devoted to classroom work and the second half to outside problems. The student learns the use of the tape, level, and transit. After completing this course he should be able to run ordinary levels, give grade for construction, stake out building foundations, and estimate quantity of earthwork.

LETTERS AND SCIENCE

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule which will be issued each semester. Courses marked with an asterisk (*) involve credit toward a university degree.

BIOLOGY

Study in the biological sciences is conducted in the co-ordinated departments of Botany, Physiology, and Zoology, which are here combined to form the Department of Biology.

The laboratory science requirement may be removed by taking Botany 1 and Animal Biology 1. Either one may precede the other, although the normal order is to take Animal Biology 1 followed by Botany 1. (See Botany 1 and Animal Biology 1.)

1. General Botany.* **5 credits.**

Two hours lecture; two hours quiz; six hours laboratory. Lab. fee, $6.

The course in General Botany is preliminary to all advanced work. The general make-up of plants is studied with special emphasis on structure, function, development, and heredity. This is followed by a survey of the plant kingdom illustrated by selected types.

Botany 1 and Botany 2 or Botany 1 and Animal Biology 1 satisfy the natural science requirement.

2. Advanced General Botany.* **5 credits.**

Two hours lecture; two hours quiz; six hours laboratory. Lab. fee, $6.

The lectures deal primarily with the history of the development of the scientific spirit in biology and involve a discussion of modern problems of evolution, inheritance, and variation. The laboratory work of the course is a comprehensive survey of the plant kingdom and includes the identification of some of the seed plants by the use of a key.

This course is accepted as a part of a teacher's minor in Botany or, with Botany 1, satisfies the requirement of a year of natural science.

Prerequisite: Botany 1.

1. Elements of Human Physiology.* **4 credits.**

Three hours lecture; two hours laboratory. Lab. fee and deposit, $3.

This is an introductory course giving a general knowledge of the structure and functions of the human body, and of foods, nutrition, hygiene, and laws of health. It is intended primarily for students desiring this knowledge as a part of their general educational equipment, and for home economics students. This course deals with the fundamental processes of cells and tissues generally, muscular activity, circulation, respiration, digestion, secretion, excretion, metabolism, the nervous system, and the special senses.

There are lectures, quizzes, demonstrations, and laboratory work. This course may be taken for 3 credits (laboratory omitted) with the consent of the instructor.

Prerequisites: Sophomore standing and either Animal Biology 1 or Chemistry 1a and 1b. (Chemistry 1b may be taken concurrently.)

For home economics students: Sophomore standing and Chemistry 1a and 1b.

1. Animal Biology.* **5 credits.**

Two hours lecture; two hours quiz; six hours laboratory. Lab. fee and deposit, $7.

This course is preliminary to all advanced work in Zoology. A study is made of biological principles as illustrated by animals. The cell theory, adaptations, physiology, embryology, heredity, and evolution are considered. The laboratory work includes a survey of the various animal groups from the simpler to the more complex, with special emphasis upon the anatomy, physiology, histology, and embryology of the frog.

Animal Biology 1 and General Zoology 2 combined or Animal Biology 1 and Botany 1 combined satisfy the natural science requirement.

2. General Zoology.* **5 credits.**

Two hours lecture; two hours quiz; six hours laboratory. Lab. fee and deposit, $7.

This course is supplementary to Animal Biology 1. Consideration is given to the completion of the survey of the main types of animals, with reference to their classification, structures, life histories, and relations to man. The laboratory work involves dissection and study of representative forms including the embryo pig; each student works out a simple genetic problem.

Prerequisite: Animal Biology 1.

CHEMISTRY

1a. General Chemistry.* **5 credits.**

Two hours lecture; two hours recitation; six hours laboratory. Lab. fee and deposit, $17.50.

The course in general inorganic chemistry begins with the study of non-metals and of the fundamental principles of chemistry.

The topics covered are: common elements; oxygen; water; hydrochloric acid; chlorine; chemical theories and laws; chemical equations and calculations; ozone; hydrogen peroxide; the halogens; acids; bases; salts; the atmosphere; ammonia and other nitrogen compounds; nitric acid; sulphur and sulphuric acid; carbon and carbon compounds; hydrocarbons and their derivatives.

In the laboratory, the important non-metals are studied. Attention is given to bleaching agents; common acids of commercial value; ammonia and other common bases; neutralization; purification of water; fuel gases and important by-products of coal gas.

1b. General Chemistry and Qualitative Analysis.* **5 credits.**

Two hours lecture; two hours recitation; six hours laboratory. Lab. fee and deposit, $17.50.

A study is made of the inorganic chemistry and qualitative analysis of the common elements. Special emphasis is given to the principles underlying the analytical procedures.

Prerequisite: Chemistry 1a.

Chemistry Laboratory

11. Quantitative Analysis.* **3-5 credits.**

Three or four credits, lab. fee and deposit, $20; five credits, lab. fee and deposit, $25.

Chemistry 11 is a course in the essentials of quantitative analysis. The student analyzes naturally occurring ores and commercial materials.

Prerequisite: General Chemistry, including qualitative analysis.

17. Elementary Chemistry.* **3 credits.**

Two hours lecture; three hours quiz and laboratory. Lab. fee and deposit, $11.40.

The general purpose of this course is to familiarize the student with the philosophy of chemistry and its relation to the complex civilization in which we are living. Rather than give the student a transient command of a restricted amount of factual material, this course endeavors to organize and explain the relationships between the phenomena that are concerned with the changes in matter, as these phenomena affect our daily lives. Special emphasis is placed on the modern scientific method of acquiring knowledge about the material universe. The course is intended for those students who are interested in chemistry for its cultural value, and it can not be used as

a substitute for Chemistry 1a and 2a. It is not open to those students who have had any previous training in chemistry. If no credit is desired, the laboratory work may be omitted.

20. Organic Chemistry.* **2 credits.**

Three hours lecture-recitation.

Organic chemistry is the chemistry of the hydrocarbons and their derivatives. The division of chemistry into two fields, that is, organic and inorganic, rests on the fact that carbon compounds originally found in nature were associated with living organisms, while the other or inorganic compounds were associated with rocks and minerals. Today we know that a vital force is not necessary for the formation of the carbon compounds, and that the chemistry of the two fields is the same. The division today is purely one of convenience.

Courses 20 and 21 should be taken concurrently.

Prerequisite: Chemistry 1 or 2.

21. Organic Chemistry.* **2 credits.**

Six hours laboratory; lab. fee and deposit, $20.

Prerequisite: Credit or concurrent registration in Chemistry 20.

117. Inorganic Preparations.* **1-4 credits.**

One credit, lab. fee and deposit, $10; two credits, lab. fee and deposit, $15; three or four credits, lab. fee and deposit, $20.

This course covers the fundamental principles of chemical manipulation and advanced general chemistry. The experimental work done gives the student:

First A grasp of the fundamental principles on which chemistry is based;

Second An understanding of the various types of reactions employed in inorganic chemistry;

Third A knowledge of the chemistry of the important types of inorganic compounds;

Fourth Greater familiarity with laboratory technique and apparatus. The discussions and reports will familiarize the student with the literature of inorganic and physical chemistry and assist him in expressing his findings clearly and concisely.

Prerequisite: 1a and 1b or 2a and 2b.

155. Advanced Quantitative Analysis.* **2 credits.**

This course is based on the application of physico-chemical methods to analytical chemistry. The topics covered include: heterogeneous equilibrium; precipitation as a rapid crystallization; co-precipitation; the phase rule and ignitions; the modern concept of acids and bases; neutralization and hydroly-

sis; buffers; oxidation and reduction; complex ions; the solubility product principle; and the analytical chemistry of common and rare elements.

Prerequisite: Chemistry 11.

DRAWING

1. Elements of Mechanical Drawing.* **3 credits.**

Lab. fee, 50 cents.

Topics treated: theory of orthographic projection; reading problems; freehand sketching; working drawings; vertical lettering; tracing.

2. Elements of Mechanical Drawing.* **3 credits.**

Lab. fee, 50 cents.

Topics treated: problems involving the conventional drawing of machine elements; graphical charts; sketches of machine parts, followed by detail and assembly drawings and tracings; slant lettering; blue printing; isometric drawing; standard drafting room practice.

Prerequisite: Drawing 1.

ECONOMICS AND SOCIOLOGY

Economics

1a. General Economics.* **4 credits.**

This course is designed to acquaint the student with the basic characteristics of our modern economic organization and the mechanism which operates our business world. A brief introduction compares our present business system with earlier systems, showing how our business, financial, and industrial organizations have developed. A study is made of the organization, management, and financing of corporations and other types of business concerns. Stocks, bonds, capitalization, large scale enterprise, and industrial combinations are examined. A section of the course is devoted to labor organization and policies, industrial conflict, and the methods of settling industrial disputes. Money, credit, and banking are considered at length with particular emphasis upon the federal reserve system and recent changes in the financial world. Other topics covered include speculation, insurance, international trade, foreign exchange, and the problems of transportation. The course closes with a study of value and prices.

Prerequisite: Full sophomore standing (25 credits; 25 grade points).

1b. General Economics.* **4 credits.**

Following the more elementary discussion of principles and problems in Economics 1a, this course takes up more advanced subjects. The first part deals with the factors which determine wages, rent, interest, and profits in the business world. Following this comes a study of the causes and effects of business cycles and price changes. The personal distribution of wealth and income is also examined in detail. Attention is given to con-

sumption and the factors affecting consumption and saving. Consideration is given to the problems in the field of public finance, such as taxation, public expenditures, public loans and debts, and to economic policies, such as laissez faire, governmental control, protective tariffs, free trade, and the control of industrial combinations. The work for the year concludes with a survey of plans for economic reconstruction.

Prerequisite: Economics 1a.

Sociology

1. Sociology.* **2 or 3 credits.**

This is an introductory course to the study of sociology and required of students majoring in sociology. The course deals with the environmental, racial, and psychological foundations of society, and a study of the fundamental social institutions and how these institutions adapt themselves to the demands of changing conditions of life and living. The lectures, readings, and discussions are planned to make clear the nature of the organization of our social structure and the means by which the members of society are controlled and directed.

Prerequisite: Full sophomore standing. (25 credits and 25 grade points).

2. Sociology.* **3 credits.**

Course 2 completes the one-year introductory course to the study of sociology. It deals with the nature of social change and the problems of social adjustment; problems of population; eugenics, race relations; problems of the family; changing status of women and children; social hazards of industrial life; group conflict; war; dependency and correction; problems of socialization. The lectures, readings, and discussions are planned to reveal how the social order is constantly changing and in what direction sound adjustments are tending.

Prerequisite: For sociology majors, Sociology 1; for others, full sophomore standing.

139M. Social Psychology.* **2 or 3 credits.**

In our modern world of increasing complexity, human behavior varies directly with increasing participation in a variety of group ideas and social situations.

Social behavior, as related to emotions, habits, fantastical and objective thinking on the one hand, and to prejudice, mental epidemics, propaganda, mobs, crowds, audiences, publics, on the other, is analyzed.

Prerequisites: Psychology 1 and junior standing, or major in sociology.

161M. Criminology and Penology.* **2 or 3 credits.**

Is crime increasing in the United States? Why is the United States the most criminal country in the world? Is mental defect the preponderant cause of crime? What about the "born criminal"? Are Americans getting

soft hearted in their treatment of criminals? What about the "third degree"? Should our prison system be abolished? What about organized crime and racketeering? These and various other questions come in for consideration and analysis.

The development of this course follows the outline of: the nature, extent, and causes of crime; the police; the jail; criminal procedure; theories of punishment, both ancient and modern; methods of treatment, such as probation, parole, and institutions, for all ages and both sexes.

Prerequisite: For sociology majors, Sociology 1 and 2 or concurrent registration in 2; for others, junior standing or concurrent registration in Sociology 2.

ENGLISH

A. Fundamentals of English. **No credit.**

This is a non-credit course in the fundamentals of the English language. Special emphasis is placed on drill in the rules of grammar and the correct expression of English. The course is mainly intended for those who recognize their deficiencies in speech and writing as handicaps in everyday life. Students who are prepared and who wish credit should take English 1a. Those wishing a course in English specifically applied to the problems of business life should take Business English and Business Correspondence.

At the discretion of the English Department this course may be required as a prerequisite for English 1a of students whose knowledge of English is not up to standard.

1a. Freshman English.* **3 credits.**

This course in Freshman English is required of all freshmen in all the colleges of the university. Its purpose is to give careful training in standard English speech and writing and to develop accuracy in thinking and skill in expression. To this end the class routine consists of the preparation of themes and exercises and the study and class analysis of representative English prose. Reports on the collateral reading from selected lists of novels, essays, plays, and poetry are required at intervals.

1b. Freshman English.* **3 credits.**

English 1b is a continuation of English 1a. In the second semester the principles of exposition are studied particularly in relation to the writing of reports of various kinds. Students are taught the methods of research, of the preparation of manuscripts, of gathering bibliography, of annotating. Students who are taking technical subjects are instructed in the methods of making technical reports in their special fields. The course continues the preparation of reports on collateral reading and the analysis of prose specimens.

Prerequisite: English 1a.

2a. Sophomore Composition.* **2 credits.**

This course deals with beginning work in narrative writing of several kinds, and with such descriptive writing as heightens narrative effect. It is a basic course in imaginative composition and may be taken for its own sake or as a preparation for either the study of literature or the practice of highly specialized writing, as drama, verse, or fiction.

Prerequisite: English 1b or a grade of "A" in English 1a.

2b. Sophomore Composition.* **2 credits.**

This is purely a course in exposition. Different forms of exposition, such as the persuasive, the analytical, the critical, the informal, and the informational, are studied and practiced. The course is designed to train in clear, compact, energetic thinking. It offers a particularly valuable preparation for persons looking forward to professional writing.

Prerequisite: English 1b or a grade of "A" in English 1a.

30a. Survey of English Literature.* **3 credits.**

This course (together with 30b) follows the historical plan of study. The selections assigned for reading and study are linked with lectures on the social and literary background from the beginning until modern times. It is designed for students primarily interested in English literature and is recommended for English majors and minors. It fulfills the literature requirement for sophomores who are candidates for the B.A. degree. The semester's work covers the period from Chaucer to Dryden.

Either Courses 30a and 30b or Courses 33a and 33b must be taken as prerequisite for all advanced courses in English literature. A student who has a semester's credit in Course 33 may not elect either semester of Course 30.

Prerequisite: English 1b or a grade of "A" in English 1a.

30b. Survey of English Literature.* **3 credits.**

This is the second semester of a year's course in the historical survey of English literature. It follows the same plan as 30a; reading assignments for each meeting are discussed in class, and the necessary historical and social background is provided by lectures. The semester's work extends from Swift and Defoe up to nearly the present time.

Prerequisite: English 30a.

33a. Introduction to English Literature.* **2 credits.**

This course is intended for those who wish to increase their appreciation and enjoyment of literature. It is a study of the types of great literature and of representative personalities in the literary field from the sixteenth century to our own time. Since the emphasis is on the appreciation rather than on the history of literature, the various authors are not taken up in chronological

order. However, part of the time is spent in lectures to give the historical background for the principal authors and to furnish the student with information about the work of these writers which will help him not only in understanding the selections assigned but also in his choice of future reading.

English 33a is parallel to English 30a (General Survey) as a prerequisite to advanced courses in English literature.

Prerequisite: English 1b or a grade of "A" in English 1a.

33b. Introduction to English Literature.* **2 credits.**

Course 33b continues the study of the types of English literature begun in the first semester. The later drama, the biography, the essay, and the novel are considered in their various typical forms. Although English 33b is a continuation of 33a, it constitutes a distinct unit in itself and may be taken as such by non-credit students.

English 33b is parallel to English 30b as a prerequisite to advanced courses in English literature. A student who has a semester's credit in Course 30 may not elect either semester of Course 33.

Prerequisite: English 33a.

39. The English Novel.* (Not offered 1932-33) **2 credits each semester.**

This is a year course in the study of the English novel. Wide reading in representative English novelists from Defoe to Hardy and Conrad constitutes the bulk of the student's work. The lectures in the course treat of the antecedents of the modern novel, the evolution of types, the influence of literary and intellectual movements upon the novel, and the lives of the more important novelists. The first semester traces the history of the novel to the end of the Eighteenth Century; the second semester to the beginning of the Twentieth Century.

Prerequisite: English 30 or 33.

40. American Literature.* **2 credits each semester.**

The aim of this course is to acquaint the student with representative and intrinsically important literature produced in the United States from the Colonial times down to the present. In the lectures an attempt is made to interpret the literature in its general social and intellectual setting and to trace the changes in literary interest and taste. In addition to tracing the main currents in American thought and culture, the lectures include biographical studies of the more important authors, stressing the facts of their lives which affected their work.

This course should be preceded or accompanied by English 30 or 33.

Journalism

1a and 1b. General Survey of Journalism.* **1 credit each semester.**

Practical talks once a week on the character and scope of journalism work, including a consideration of newspapers, magazines, technical and

trade journals, agricultural publications, and advertising, are given. This course is required of freshmen who intend to enter the School of Journalism; it does not count for credit toward graduation from the general courses in Letters and Science.

11M. Magazine Writing. **No credit.**

The purpose of this course is to give to the student basic training in the preparation and sale of non-fiction material for magazines and newspapers. The course is definitely realistic in its methods, since the actual sale of the material produced by the members of the class is looked forward to. Types of magazine articles, the organization of feature stories, the technique of interviewing, the use of photographic material, and the fashion in news articles are among the topics treated in class. Reading, criticism, and suggested revision of papers prepared by members of the class are a regular part of the program.

17M. Problems of Magazine Writing. **No credit.**

The purpose of this course is to develop the special abilities of the individuals in the class to meet the needs of particular markets. The course is open to those who have taken the course in Magazine Writing 11M and to others who have the ability to produce marketable non-fiction material. The student is assisted in the analysis of the requirements of the market at which he is aiming and in the sale of his production. Because of the individual nature of the work in this class the enrollment is limited to twenty-five.

14M. Short Story Technique. **No credit.**

Fiction writing is most conveniently mastered by practice with short units, and, whether one's interest is artistic or commercial, a thorough study of technique will very greatly shorten the necessary training period. The course treats of the gathering, sifting, filing, and manipulation of material, the finding, refining, and strengthening of ideas, the development of the plot and the handling of its elements for presentation, and the creation of the final result—an interesting and convincing illusion in whatever type is aimed at by the student. The psychological processes involved are analysed and explained. The instructor will criticise an unlimited amount of **new** manuscript from each student in the course.

15M. Commercial Short Story Writing. **No credit.**

This course is independent of any other and may profitably be taken both by those who have just acquired a sound grasp of basic technique and by those who have sold dozens of stories but have paid little attention to the marketing problem as a whole. Changes in reader interest and in magazines go on continually; the writer as a business man cannot afford to ignore such matters. The class studies intensively all the important markets for short fiction and the differences in treatment required to adapt a story to a given market or revise it for a different one. Manuscript criticism will be based on

the questions: Is there a market for this story material? How can the story be made salable? The content of the course is practical, specific, thorough, and up to the minute. The student may submit any number of complete manuscripts for practical criticism and round-table discussion.

For other courses in English, see pages 50 and 78.

GEOGRAPHY

Geography 5 and 6 are consecutive introductory courses in geography, and together they form a unit of work for one year. They are intended primarily for students expecting to enter the School of Commerce, and for those desiring a general cultural background of world geography without laboratory training.

5. Regional Economic Geography.* **3 credits.**

This course includes (1) a brief survey of those elements of natural environment (climate, land forms, soils, etc.) which have the greatest habitat value and (2) the geography of the United States.

It is open to freshmen.

6. Regional Economic Geography.* **3 credits.**

The economic geography of the world outside of the United States is covered in this course.

Prerequisite: Geography 5.

HISTORY

The introductory courses 1, 2, 5, and 10 are the courses open to freshmen. Students may take only one of these courses for three credits a semester, since each contains introductory training for which credit ought not to be given twice; that is, if they have had or are taking one of these courses for full credit, another may be taken from this group for two credits a semester only, omitting the supplementary reading and a topical report. Students not registered in the College of Letters and Science may take any of the introductory courses for two credits each semester.

1a. Medieval History.* (to 1100) **2 or 3 credits.**

In this course an attempt is made to show the relationship between the three elements of Medieval History: the Legacy of Greece and Rome, the Christian Church, and the Germanic Peoples. The course begins with one element, Rome, already declining, and with another, the Church, just rising, as a political power; the Germans are threatening on the Roman frontier. The growth of the Church as a cultural political power forms one development, while the advance of the Germans in government and cultural appreciation forms another.

1b. Medieval History.* (1100-1500) **2 or 3 credits.**

Beginning about 1100, the course follows closely the work of the Medieval People in the Crusades and the Town Movement, resulting from trade and industry. The intellectual life is seen in the founding of the Universities and in the studies pursued near them. Medieval literature, Latin and vernacular, is read, and some architecture is viewed. In the political sphere the development of France, England, and Germany, and the conflicts with ecclesiastical power find their place. The last six weeks of the course are spent on the Renaissance in its various aspects: painting and sculpture, architecture and literature.

Prerequisite: History 1a or consent of instructor.

2a. Modern European History.* (1492-1815) **2 or 3 credits.**

The course is a study and an analysis of the chief movements in European History between 1492 and 1815. It begins with the commercial and religious revolutions of the fifteenth and sixteenth centuries and closes with the agricultural, industrial, and political changes of the eighteenth century. A study is made of the governmental and cultural developments of the great states, at times in topical order, at times in biographical sketches. The overseas expansion of the European countries is traced to various parts of the globe—America, Asia, Africa. Special attention is given to the ideas and reforms of the enlightened despots of the eighteenth century, and to the writings and teachings of those who criticized the Old Regime which these despots hoped to continue. The course closes with the victory of the critics, with the French Revolution, and the spread of the revolutionary ideas in the Age of Napoleon.

2b. Modern European History.* (1815 to the present) **2 or 3 credits.**

In general the course is an analysis of the factors and circumstances bringing about the Great War and an estimate of the problems and conditions of the post-war period. The first part of the course takes up the struggle and victory of conservatism against the new forces spread by the French Revolution and Napoleon. This part ends in 1848. Several weeks then are spent in following the triumph of Liberalism and Nationalism during the second half of the nineteenth century; the formation of the Third French Republic and the rise of the German Empire are traced. Some time is spent on Italy; some attention is given to the national movements in Austria, Russia, and the Balkans. The course then follows these nations in their penetration of Asia and their partition of Africa; and to the vicious European rivalries is added the international competition for colonies and commerce. The connection of this competition with the formation of European alliances and the gradual division of Europe into two opposing camps are explained. An attempt is made to correlate the national movements, the commercial and colonial rivalry, and the growing tension between the two opposing forces, all which caused the World War. Post-war conditions are viewed as continuations of nineteenth-century developments, and the problems following the

World War are compared and contrasted with those succeeding the Napoleonic Era.

Prerequisite: History 2a or consent of instructor.

5a. English History.* **2 or 3 credits.**

Course 5a begins primarily with the Anglo-Saxon invasions and traces the growth of English institutions to the death of Queen Elizabeth. Stress is given to the contributions of the various peoples migrating to England, and comparisons are made with existing institutions in Europe. The course deals with the life of the people, their religion, government, and social and economic progress. The central theme is to develop an understanding of those factors which aided in the transition of England into a modern state.

5b. English History.* **2 or 3 credits.**

This course traces the development of English institutions from the accession of James I to the present. Emphasis is placed upon the rise of responsible government and democracy, the industrial revolution, and commercial expansion of the English people. In this connection, political and economic reforms are studied as an indication of the progress of modern England. The formation of the British Empire and growth of imperialism receive attention, especially in view of British participation in world politics.

Prerequisite: History 5a or consent of instructor.

10a. Ancient History.* (Oriental and Greek History) **2 or 3 credits.**

Course 10a begins with the development of the two great Oriental centers, Egypt and Mesopotamia, where excavations almost daily bring forth more proof of the greatness of these peoples. The adoption of their culture by the Greeks and the "Classical Era" form the greater part of the course. The Persian and Peloponnesian Wars are brought in, but never too much to hinder the studies of cultural development, as we find it in their games and oracles, their plays and songs, their temples and shrines. The social and legal aspects of life are studied in the development of Athenian Democracy as well as in the camp of the Spartan soldier. The course ends with the Post-Periclean Age.

10b. Ancient History.* (Hellenistic Age and Rome) **2 or 3 credits.**

During the first weeks this course is a study of Alexander's conquests and the results of these conquests. In the realm of politics and industry as well as in literature, philosophy, and science comparisons and contrasts are drawn between the Hellenistic and the Periclean ages. The background is given for Rome's task in the path of civilization.

The last twelve weeks are spent on Rome. This part includes Republican Rome, its expansion over the Mediterranean, its great social and economic problems under the Gracchi, and its ultimate failure. The process of reconstruction in the Empire of Augustus receives considerable attention, since it covers almost all phases of Roman life and letters. The Roman legions are

followed to the various parts of the known world, where they build roads and erect temples, aqueducts, and baths, symbols of Roman victory and advance. Some time is spent on the new element, Christianity, as it grows up. The course ends with the "Decline and Fall of the Roman Empire."

Prerequisite: History 10a or consent of instructor.

4a. History of the United States.* **3 credits.**

This course traces the development of American nationality from 1793 to 1840. Emphasis is placed on the origin and formation of the national government and those factors which influenced its growth. The gradual evolution of democratic institutions, the emergence of an American spirit, and the social and economic life of the new nation receive consideration.

Prerequisite: Sophomore standing.

4b. History of the United States.* **3 credits.**

The emergence of the United States into a world power is the central theme of this course which extends from 1840 to the present day. Emphasis is placed upon the slavery controversy, growth of industry and "Big Business," the rise of organized labor, party politics, and American imperialism. The aim of the course is to develop an understanding of present day America with its complexity of social, economic, and political problems.

Prerequisite: Sophomore standing.

LANGUAGE REQUIREMENT FOR THE B.A. DEGREE

Under the new plan recently adopted at the University of Wisconsin, candidates for the B.A. degree may meet the requirement in foreign language in one of the following ways:

1. By passing examinations in what is known as the intermediate or reading examination in two languages.
2. By passing what is known as the proficiency examination in one language.

The student is still required to earn 120 credits for graduation, but no specified number of credits must be earned in foreign language. A student may at the time of entrance, or whenever he feels properly prepared, take either the reading examination in two languages or the proficiency examination in one language. If he passes, he will be exempt from any further language study, so that the credits which he might have been obliged to earn in language may be earned in other subjects. Languages may, of course, be continued as electives.

The reading examination should be within the ability of the average student who has had two years of the languages concerned in college or two years in high school plus one year in college.

The proficiency examination may be attempted by good students who have had the equivalent of three years of college instruction including a course in conversation.

Content of Examinations

The reading examination will test the student's ability to comprehend prose in the foreign language of about the difficulty of texts now used in the fourth semester. He will also be required to translate a passage from the foreign language into good English and to show familiarity with idioms and vocabulary. In addition the student must demonstrate his ability to pronounce the language by reading a passage out loud in the presence of the examiner.

The proficiency examination in addition to testing the ability to comprehend the printed page will test the student's knowledge of literature and history as related to the language involved. There will also be an oral examination to test the student's ability to understand and answer simple questions in the foreign language.

Arrangements for Examinations

These examinations will be held soon after the opening of the first semester, between semesters, and near the end of the second semester. The exact time and place will be announced by the Recorder.

Students planning to take these examinations should consult Dr. Purin for German, Miss Steinfort for Spanish, and Dr. Young for French. Formal application for permission to take the examinations should be made to the Recorder at times to be announced.

Students who fail may take the examinations again, whenever offered.

LANGUAGES

French

1a. First Semester French.* **4 credits.**

The primary object of this course is to teach the student to read simple French prose as a foundation skill to which other skills such as speaking, understanding, and writing may be added later. Grammar is presented from the recognition or French-English point of view. The work also includes the acquisition of a vocabulary of 500 words based on the Vander Beke word count, selected idioms from the Cheydleur list occurring in the texts read, pronunciation, ear training.

1b. Second Semester French.* **4 credits.**

The work of the preceding semester is continued with review of grammar, an additional 500 word vocabulary, continued study of idioms, the writing of simple French, oral and aural practice. Attention is given to the culture of the French people.

Prerequisite: French 1a or one year of high school French.

10a. Third Semester French.* **3 credits.**

The primary object of the course is to increase the reading ability acquired in the first year. The vocabulary of French 1a and 1b is reviewed, and

the study of idioms based on the Cheydleur list is continued. There is also a review of irregular verbs and pronunciation. Grammar is reviewed and studied in connection with the texts read and as contributing to their better understanding. Opportunity is afforded for oral and aural practice. Students who expect to benefit most from the course are given an opportunity to do out-of-class reading.

Prerequisite: French 1b or two years of high school French.

10b. Fourth Semester French.* **3 credits.**

French 10b continues the work of Course 10a. Vocabulary study is continued with a second list consisting of 1000 words based on the Vander Beke word count. Attention is given to the literary aspects of the works read with a view toward establishing an appreciation of French literature.

Prerequisite: French 10a or three years of high school French.

15a. Elementary Composition and Conversation.* **2 credits.**

This is a supplementary course to be taken with French 10a and 10b. It is not open to students who have had the equivalent of two years of college French, except by special permission.

15b. Elementary Composition and Conversation.* **2 credits.**

This is a continuation of Course 15a. It is open to properly qualified new students.

21a. Elementary Survey.* **3 credits.**

French 21a is a third year course planned to cover French literature in outline, with illustrative readings from the principal periods, movements, and writers. The course includes a study of the literary aspects of the works read, and literary history. This course or its equivalent is prerequisite to all advanced courses in French literature.

Prerequisite: French 10a and French 10b, or four years of high school French.

21b. Elementary Survey.* **3 credits.**

This is a continuation of Course 21a. It is open to properly qualified new students.

German

1a. First Semester German.* **4 credits.**

Training in pronunciation is given through oral and aural exercises to insure fluency in reading. The 500 most frequent words and some 40 of the most frequent idioms are mastered. Essentials of grammar are covered exclusive of the perfect tenses of the indicative, active voice, and the perfect tenses of the subjunctive. The grammatical topics included are declensions,

conjugations, case government, and word order. The reading requirement, in English, is some 100 pages on Germany and its institutions. Types of texts used in class: Hagboldt's **Deutsch für Anfänger** and **Lesebuch für Anfänger.** Outside reading: Seeligmann's **Altes und Neues.**

1b. Second Semester German.* **4 credits.**

Grammar essentials are reviewed. Special topics for this semester are the subjunctive and the passive. An additional 600 most frequent basic words and about 60 idioms are mastered. The required reading, in English, is some 200 pages on German culture and civilization. Some 125 pages of intermediate prose are read in class and approximately 125 to 175 pages outside. Types of texts used in class: Storm's **Immensee** and Gerstäcker's **Germelshausen.** Outside reading: Stern's **Geschichten vom Rhein** and Grimm's **Kinder und Hausmärchen.**

Prerequisite: German 1a or one year of high school German.

2a. Third Semester German.* **4 credits.**

Some 200 pages of narrative and dramatic prose, with oral and written reproduction, are read in class, and about 250 pages of intermediate grade outside. An additional 700 of the most frequent words and some 100 idioms are mastered. The reading requirement, in English, is 300 pages bearing on German culture and civilization. Types of texts used in class: Bonsel's **Die Biene Maja** and Purin-Rose **Kulturkunde** (text edition). Outside reading: Baumbach's **Der Schwiegersohn.**

Prerequisite: German 1b or two years of high school German.

2b. Fourth Semester German.* **4 credits.**

Some 300 pages of novelistic literature and lyrics are read in class and some 300 pages outside. Purin's **Standardized German Vocabulary of 2000 Words and Idioms** is mastered. Composition work is based on the texts read. Types of texts used in class: Sudermann's **Frau Sorge,** Hauptmann's **Einsame Menschen,** and Keller's **Romeo und Julia auf dem Dorfe.** Outside reading: Storm's **Pole Poppensäler,** Fulda's **Unter vier Augen,** Löns' **Die Häuser von Ohlenhof,** collections by Diamond and Rosenfeld under the title **Still und Bewegt.**

Prerequisite: German 2a or three years of high school German.

3. Selected Masterpieces.* **4 credits.**

Some 400 pages are read in class and an equal amount outside. Practice is given in composition and conversation. Types of texts used in class: Grillparzer's **Des Meeres und der Liebe Wellen,** Goethe's **Hermann und Dorothea,** and Koischwitz' **Deutsches Geistesleben der Gegenwart.** Outside reading: Storm's **Der Schimmelreiter,** Mann's **Tonio Kröger,** and Schiller's **Wilhelm Tell** or **Jungfrau von Orleans.**

Prerequisite: German 2b or four years of high school German.

40. Elementary Conversation*. **1 credit.**

The work consists of class discussion in German of simple topics based on reading or illustrative material.

Prerequisite: German 2b or equivalent.

Latin

1. Elementary Latin.* **5 credits.**

(Not offered in 1933-34)

The object of the course is to present the fundamentals of Latin with special emphasis on the relationship of English to Latin. As far as possible the work of the course not only prepares students for further study of the Latin language and literature, but gives to those who expect to study law, medicine, or other sciences, a better understanding of the terminology of those subjects.

2. Caesar.* **5 credits.**

(Not offered in 1933-34)

The course in Caesar is the equivalent of the second year high school Latin. It consists of readings from Caesar's **De Bella Gallico** with exercises in composition at least once a week.

Prerequisite: Latin 1 or one year of high school Latin.

Spanish

1a. First Semester Spanish.* **4 credits.**

Spanish 1a includes careful training in pronunciation, much oral and aural practice, a study of the fundamentals of grammar, and the acquisition of a vocabulary of at least 500 words used in the oral work and reading and checked with the Spanish word and idiom lists. The reading of simple Spanish is started early in the semester. In addition, students are required to do outside reading in English on the history, life, and customs of the Spanish and Latin-American peoples.

1b. Second Semester Spanish.* **4 credits.**

Spanish 1b continues the practice in pronunciation and oral work, the study of grammar, and the acquisition of basic vocabulary and idioms. The reading of Spanish in class is supplemented by easy readings in the foreign language outside of class.

Prerequisite: Spanish 1a or one year of high school Spanish.

10a. Third Semester Spanish.* **3 credits.**

Spanish 10a continues the study of the Spanish people through the reading of a number of novels, short stories, and plays by the best modern authors. Oral and written work is based on the reading. There is a review of grammar with additional finer points in syntax; also a further study of vocabulary and idioms.

Prerequisite: Spanish 1b or two years of high school Spanish.

10b. Fourth Semester Spanish.* **3 credits.**

Spanish 10b is a continuation of the work of Course 10a with an increase in the amount and degree of difficulty of reading. More extensive oral and written reproduction of content in Spanish is required.

Prerequisite: Spanish 10a or three years of high school Spanish.

20a. Elementary Conversation and Composition.* **2 credits.**

This is a supplementary course to be taken with Spanish 10a and 10b. It is not open to students who have had the equivalent of two years of college Spanish, except by special permission.

Prerequisite: Spanish 1b or equivalent.

20b. Elementary Conversation and Composition.* **2 credits.**

This is a continuation of Course 20a. It is open to properly qualified new students.

Prerequisite: Spanish 20a.

21a. Elementary Survey.* **3 credits.**

Spanish 21 comprises a brief study of the history and the development of all types of Spanish literature—the epic, the drama, prose writings, lyrics, the novel—covering the centuries from 1140 to the present. This study is centered around and illustrated by the reading and interpretation of representative works of each type.

Prerequisite: Spanish 10b or equivalent.

21b. Elementary Survey.* **3 credits.**

This is a continuation of Course 21a. It is open to properly qualified new students.

MATHEMATICS AND ASTRONOMY

1. College Algebra.* **4 credits.**

College Algebra is strongly recommended for all students in commerce and may be offered as an elective in any four year course in the College of Letters and Science.

The following subjects are taken up: logarithms; simultaneous, linear, and quadratic equations; binomial theorem; progressions; compound interest; probabilities.

Prerequisite: One year of high school algebra or its equivalent.

Students who have had three semesters of high school algebra, see chairman of department.

Students who have had two years of algebra in high school are not permitted to take this course for credit.

2. Trigonometry and Analytic Geometry.* **4 credits.**

This course is a combination of what was formerly Mathematics 2 and Mathematics 4. The following subjects are discussed: trigonometric func-

tions; identities; logarithms; solution of right and oblique triangles; systems of coordinates; transformations of coordinates; the straight line; conic sections, and special curves. This course completes the student's preparation for Calculus.

Prerequisite: One and one-half units of high school algebra or college algebra.

3. Analytic Geometry.* **3 credits.**

Analytic geometry is prerequisite or co-requisite for calculus for Letters and Science students.

The following subjects are discussed: Cartesian coordinates; polar coordinates; transformation of coordinates; the straight line, conic sections; tangents and normals; the general equation of the second degree; transcendental and parametric equations.

Prerequisite: High school trigonometry. Students may take this course simultaneously with Mathematics 5a.

5a. Differential Calculus.* **3 credits.**

Students who intend to major or minor in mathematics or science are advised to take this course, together with Course 5b, in the sophomore year. It corresponds roughly to Mathematics 54, 4 credits, offered primarily for engineering students but is open to others.

Prerequisite (or co-requisite): Mathematics 2 or 3.

5b. Integral Calculus.* **3 credits.**

Prerequisite: Mathematics 5a.

6. Determinants and Analytic Geometry of Three Dimensions.* **3 credits.**

All undergraduate majors in mathematics are required to take this course. Content of course: systems of coordinates; the equation of a surface; projections; direction cosines; change of axes; the plane; the straight line; the sphere; the cone; conicoids; axes; generating lines; the general equation of the second degree.

Prerequisite (or co-requisite): Mathematics 5a or 54.

7. Theory of Investment.* **4 credits.**

Students in the Commerce Course are required to take this course. The following subjects are taken up: interest annuities, amortization, bonds, sinking funds, depreciation, and building and loan associations.

Prerequisite: Mathematics 1 or 51, or two years of high school algebra.

112. Differential Equations.* **3 credits.**

This course provides a thorough introduction to the study of the solution of ordinary and partial differential equations. Special attention is paid

to the applications of differential equations occurring in engineering, physics, and geometry.

Prerequisite: Calculus.

117. Vector Analysis.* **3 credits.**

This course is an introduction to the study of vectors and vector functions with special applications in the fields of geometry, physics, and mechanics. Some of the subjects taken up are: the algebra of vectors including vector and scalar products; differentiation of vectors and vector differential operators.

Prerequisite: Calculus.

125. Theory of Equations.* **3 credits.**

Some of the subjects taken up in this course are: complex numbers, elementary theorems on the roots of an equation, cubic and quartic equations, Sturm's method, Herner's method, Newton's method, and systems of linear equations.

Prerequisite: Consent of instructor.

Astronomy

1. General Astronomy.* **3 credits.**

To give the student an understanding of the problems which concern the astronomer and of the methods by which he attacks these problems is the object of this course. Attention is paid both to the history of the science and to its modern developments. Mathematics is not required for this course. One night each week, if the sky is clear, is devoted to observation.

Not open to first semester freshmen.

6. Navigation.* **2 credits.**

This course is designed for students who wish an elementary course in Practical Astronomy or who wish to become familiar with the methods by which the position of a ship at sea is determined. Some of the subjects taken up are: instruments used in navigation; latitude by Polaris; latitude by a meridian altitude of the sun; azimuth; longitude by a time sight of the sun or a star; the method of Marc St. Hilaire; the line of position; and modern methods in practical navigation.

Prerequisite: Trigonometry.

PHYSICS

1a. General Physics.* **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

The following subjects are treated: mechanics, heat, magnetism, and static electricity. The course is open to any Letters and Science student.

1b. General Physics.* **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

The following subjects are treated: current electricity, sound, and light. Students entering the second semester who have had high school physics may take this course with the consent of the chairman of the department.

Prerequisite: Physics 1a.

For information about Physics Exhibition, see page 14.

PHYSIOLOGY, SEE PAGE 72.

PSYCHOLOGY

50M. Applied Psychology of Learning. **No credit.**

This is a laboratory course devoted to the establishment of effective study habits. An intensive study is made of principles underlying academic work such as budgeting time, efficient reading, recitation methods, note making, and organization of knowledge. Extensive practice is given in the skills involved.

The course is open to any freshman or sophomore and requires no fee.

1. Introduction to Psychology.* **3 credits.**

This is an introductory survey of psychology in regard to material, fundamental laws, applications, and relations to other sciences. The specific topics covered are: physiological and neurological basis of behavior, learning and habit formation, attention, imagination, thinking, personality and character, intelligence, and insanity and dissociation.

Prerequisite: Sophomore standing.

100M. Seminar in Problems in General Psychology.* **1 credit.**

This is a discussion and reading course in which the student is permitted to follow a line of study which may be of particular interest to him.

Prerequisite: Psychology 1, and instructor's permission.

SOCIOLOGY

See Economics, page 77.

SPEECH

1. Fundamentals of Speech.* **3 credits.**

The recitation hours are devoted to practice speaking before the class, the analysis of individual difficulties, and suggestions for improvement. The lecture hour is planned to give the student an understanding of the speech function.

Prerequisite: Sophomore standing.

3. Argumentation and Debate.* **3 credits.**

The problems involved in gathering material and constructing the type of composition which aims to persuade or to convince are considered in this course. Various types of persuasive speeches are prepared and delivered.

Prerequisite: Speech 1, 7, or 8.

7. Public Speaking.* **2 credits.**

This is a practical course to help business and professional men and women in their speaking, both in public and in private. A maximum of platform work is required of each student. The theory offered is applied, immediately, to actual speaking situations. The course is designed to teach the individual to prepare and deliver speeches creditably.

Prerequisite: Sophomore standing.

8. Extempore Speaking.* **2 credits.**

This course is similar to Speech 7, but is open to freshman engineering students. It is required of electrical engineers.

9. Parliamentary Practice.* **2 credits.**

The purpose of this course is to give a working knowledge of parliamentary practice. A careful study is made of rules of procedure. A maximum amount of actual practice in conducting meetings is made available. Satisfactory completion of the course should enable the student to preside over, or take an intelligent part in, any organized meeting.

Prerequisite: Sophomore standing.

708M. Foreign Accent Correction. **No credit.**

In this class for the correction of foreign accent a thorough study is made of all the sounds in the English language. This includes the physical origin of each sound, which is studied by means of charts and hand mirrors. A great deal of individual and class drill is carried on to perfect the facility of pronunciation. Reading out loud varies the idea of the drill. Those students who need individual help are given it at the discretion of the instructor. Criticism by the instructor as well as by members of the class helps the student to discover incorrect pronunciation. It aids the class in recognizing mispronunciation in others. Some drills for home study are given the student at the close of each class period.

For other courses in Public Speaking, see page 43.

For information about The Clinic for the Correction of Speech Defects, see page 17.

ZOOLOGY

See page 73.

LIBERAL EDUCATION

For time, fee, and instructor, consult schedule which will be issued each semester.

An Approach to the Fine and Industrial Arts.

An analysis is made of the various arts, including painting, the graphic arts, the art of printing and illumination, the art of the child, as well as the practical application of art principles in everyday life. All the lectures are fully illustrated by projecting two slides on the screen simultaneously.

The course is planned for those who wish to become more fully acquainted with some of the underlying principles of art without a too didactic or chronological detail of any one specific field. It comprises lectures on the following topics: an introduction to the art of painting; a comparative analysis of painting; revolutionary art; great paintings in European galleries; the graphic arts—how to understand prints; the art of writing and printing; the three dimensions of color; color in industry; good and bad art in everyday objects; art in display advertising; testing appreciation; the art of the child; important contemporary American painters.

Art in Russia and in Northern Europe.

To show the powerful influences that have come into contemporary painting outside of the French school is the principal object of this course. It deals with the art of painting in Russia, beginning with the ikons, followed by the Romantic School in the nineteenth century and by the Russian nationalists at the end of the century. It then takes up the organizations of the great modern schools of Russia from 1900 to 1914; the Revolution and the contribution of Russia to America; and finally the brilliant and sensational painting of Soviet Russia.

A number of lectures are devoted to modern German painting to show what existed in Germany immediately before the World War and what has resulted through German expressionism. The last four lectures cover the development of the Scandinavian schools with special reference to the newest painters of Denmark, Sweden, Finland, and Norway; the art of the newly freed Poland, which includes twenty of the most interesting names in contemporary painting; and the eminent arts of Czechoslovakia, concentrated in Prague.

Child Psychology.

A series of lectures is given on current theories of child psychology based upon recent experimental evidence and scientific studies. After a brief survey of modern methods in the study of child psychology the following and similar topics are taken up: child morals; conditioning of emotions; social behavior of the child; language development; children's play, games, and other amusements; environmental forces in behavior and development; the learning process; the gifted child.

The lectures present the data of the most important experiments; consider critically the interpretation of these data; and suggest their practical application in the rearing of children.

Time is allowed for class discussion and the study of special problem cases if the class desires.

Contemporary American and English Drama.

This course attempts the analysis, interpretation, and evaluation of the plays of the more important contemporary American and English dramatists. Attention is focused on the individual playwright in order to understand his purpose, his technique, and the circumstances of his life affecting his work, and to arrive at a critical estimate of the worth of his contribution to the theater and to literature.

Among the authors whose plays are considered in the lectures are Eugene O'Neill, Philip Barry, Elmer Rice, Sidney Howard, George Kaufman, Marc Connelly, Maxwell Anderson, Rachel Crothers, George Kelly, George Bernard Shaw, John Galsworthy, St. John Ervine, A. A. Milne, Somerset Maugham, Saen O'Casey, and John Drinkwater. Special topics, such as the Irish Theater and the Little Theater Movement, are also discussed.

Contemporary European Drama.

This series of lectures deals interpretatively and critically with the more important plays that have been produced on the English and American stage in recent years.

Among the dramatists studied are Ibsen, Schnitzler, Sudermann, Hauptmann, Chekhov, Andreyev, Gorki, Molnar, Benavente, Pirandello, Capek, and Benelli. Most of the plays of this group are available for reading in English translations.

Elements of Chemistry.

The general purpose of this course is to familiarize the student with the philosophy of chemistry and its relation to the complex civilization in which we are living. Rather than give the student a transient command of a restricted amount of factual material, this course endeavors to organize and explain the relationships between the phenomena that are concerned with the changes in matter, as these phenomena affect our daily lives. Special emphasis is placed on the modern scientific method of acquiring knowledge about the material universe. The course is intended for those students who are interested in chemistry for its cultural value.

Great English Poets.

The course includes, in a survey of the development of English poetry, a study of the great poets from Chaucer to those of our own day. The lectures present the background against which the poets developed their art and, in addition, serve to make clear the links which unite the centuries in the progress of English poetry. The poets studied include the following:

Chaucer, Spenser, Shakespeare, Milton, Dryden, Pope, Wordsworth, Byron, Shelley, Keats, Tennyson, Browning, Arnold, Swinburne, Hardy, Housman, Masefield, Yeats. Selected reading lists will be prepared which will present, as far as is possible within the scope of the lectures and general reading, a fairly intimate study of the progress of English poetry as it finds expression in its great poets.

History of Architecture.

These lectures show by means of lantern slides the development of architecture up to the present time. They are intended for those who wish to obtain a better appreciation and comprehension of the art of building; also to be better able to pass judgment on what is good or bad architecture.

A survey is made of the past styles, with explanations of how geographical location, available building material and labor, religion, and social life determined each style, and how well each period of building solved the particular problems of its time. This is done so that the student may be better able to estimate contemporary work.

Home Planning and Decorating.

The buyer of a ready built home, the planner of a new home, or the renter of a home or an apartment is helped by this course to avoid some of the undesirable features that take from the comfort and convenience of home life. The course includes a study of furniture selection, buying and values, how to arrange furniture according to a plan, how to make use of textiles in home furnishing, how to go about selecting carpets and rugs, how to work out a color plan, and how to achieve inviting, cozy homes with an economical expenditure of money.

Home Planning and Decorating. (Advanced Course.)

This is a continuation of the elementary course in Home Planning and Decorating. Among the furnishings of the home which are studied with the end in view of selection and use are: china, silver, linen, flowers in and around the home, plants, carpeting, pictures, and lamps. Many of the meetings are held in various stores and decorative establishments with the cooperation of persons who are authorities in their fields.

Human Body.

The scientifically accepted general knowledge of the structure and functions, or internal economy, of the human body is reviewed. The discussions include: the physical basis of life; the dynamics of life processes; the distinctive function and correlation of the various physiological systems—nervous, reproductive; framework; muscles; circulation and blood; respiration; digestion; secretion; excretion; metabolism; and the protective devices of the body.

Human Mind.

In this course are considered the different theories of how the human mind functions. In order to present these theories in an understandable manner some attention is given to the construction and organization of the nervous system and the glandular system. The results of experimental work on animals and on man are presented to show what happens when parts of the human body are destroyed or eliminated. Some time is devoted to a consideration of Spearman's two-factor theory of intelligence, Thorndike's theory of intelligence, and the theory of unique traits. Material is also presented on the question of the inheritance of mental ability. Other topics covered are learning, emotion, attention, and thinking.

The material is treated in a popular manner so that a layman will have no difficulty in understanding it.

Masterpieces of World Literature.

In this series of lectures by various members of the faculty, a survey is made of the great literary figures and movements in the development of world literature. The opening lecture prepares the background through a discussion of the beginnings of literature naturally leading to the great epic period centered around the name of Homer. The progress leads to the beginnings and growth of the Greek drama in the Golden Age of Greece, dominated by the geniuses of Aeschylus, Sophocles, and Euripides. Roman literature in the Augustan Age, especially with reference to Virgil and Horace, is surveyed.

Subsequent lectures deal with the heroic period and more modern literary movements in Ireland, England, Germany, and the Scandinavian countries. A survey of continental Europe includes a study of the high points of early French literature—the song of Roland, the Breton Romances; the Renaissance, Rabelais, Ronsard, and Montaigne. In the classical period, Racine, Moliere, and Corneille are studied.

In Italian literature the great figures of the trecento, Dante, Petrarch, and Boccaccio, are presented, and in Spanish literature the romantic figure of the Cid. In Spanish drama Lope de Vega and Calderon are studied; in romance, Cervantes and the immortal figure of Don Quijote.

The course concludes with lectures on Russian literature. The cultural development of the Slavic people is noted. A study is made of the old legends and ballads. The great Russian writers, Pushkin, Lermontof, Gogol, and Nadson, are presented. Lists of readings are given to members of the class, extracts from the various works are read, and, whenever possible, the lectures are illustrated by slides.

Modern World Politics.

Since the Great War wide interest has been manifested in the relationships of nations and peoples. The primary purpose of this course is to present the background and development of these relationships, with the resulting problems which occupy the attention of leading world statesmen. The growth of imperialism and clashes of interest in various parts of the world, the

economic causes of war, the growth of nationalism, and the activities of "jingoes" are considered in the approach to the course.

The twentieth century and the post-war period receive particular emphasis, especially the phases dealing with the reconstruction of Europe, the development of peace machinery, and the attempts to outlaw strife. Both American and European relationship are stressed in the light of the problems of war debts, economic depression, disarmament, and points of friction. A glance into the political machinery of the world is taken in an effort to show clearly the present situation with possible solutions for the future.

New Education in Home and in School.

This course is an introduction to a new philosophy of education, designed to be of interest to teachers, parents, and social workers. Its purpose is to give the student an insight into the fundamental theory of the new education and its application in school and home. The course gives an appraisal of present ideals and traditions in their historic setting. It analyzes the nature of the preparation needed by the individual for life in modern society and the reasons why a new type of education is needed.

Theories of outstanding educators, contributions of recent psychological research, and work of experimental schools in Europe and America receive a careful consideration from the point of their social usefulness. Sufficient time is allowed for discussions.

Our Universe.

This series of lectures on the physical universe, man's relation to it, and his efforts to discover its secrets is given by five members of the University Extension Division faculty. The student of history finds that one thing common to all cultures and all civilizations is man's search for knowledge. This course presents the story of this search for knowledge and discusses many of the methods used and the results obtained.

The course is divided into five groups of lectures as follows:

Group 1 (3 lectures) **Astronomy.**

Much of man's knowledge of the physical universe came as a result of his study of the stars and the celestial galaxy. This group of lectures presents in succession the pictures which man has held of the universe of the stars from the most ancient times up to the present, and tells something of the method by which the modern viewpoint in astronomy has been reached.

Group 2 (4 lectures) **Physics.**

These lectures present a digest of the development of physical science from Galileo to Einstein. The relationship between matter and electricity and between radiant energy and atomic structure is set forth in terms the layman can readily understand. The lectures draw us from the realms of interstellar space back to the earth itself.

Group 3 (4 lectures) **Chemistry.**

It has been said that man is essentially a walking colloid. In order to appreciate the unique position man holds in life, it is essential to understand something of the chemistry of the universe as well as of man. These lectures give an understanding of the fundamental principles of chemistry with special reference to life on the earth.

Group 4 (3 lectures) **Biology.**

These lectures are an attempt to answer the question, "What is life?" and to present the story of man's search for the answer to this question. The story proceeds from a discussion of the most elementary life units through animals and plants and ends with a discussion of the, animal, man in his world.

Group 5 (3 lectures) **Physiology and Psychology.**

Man's search for knowledge in the physical universe may very properly end with man's study of himself as a living and thinking organism. This group of lectures discusses the physical mechanism of man, how he adapts himself to his world, how he modifies this world, and in fact, creates his own world.

Personnel Problems.

This is a course designed especially for people in industry or for people who have industrial contacts. The problem of the adjustment of the individual to industrial conditions is discussed. The method used in the course is the case method. Actual cases of maladjustment together with their diagnosis, analysis, treatment, and follow-up are presented. Problems of discipline, vocational adjustment, emotional instability, and various kinds of handicaps are among those illustrated by specific cases. The method of conducting the class is a semi-conference method. The main facts of the case are presented to the class and the solution arrived at through class discussion. This is then checked against the actual solution and situation resulting therefrom.

Problems in Taxation.

This is a non-technical course in public finance designed to acquaint the public with the fundamental principles and current problems in taxation. A study is made of the leading local, state, and national taxes now being levied, together with their merits and defects. Particular attention is placed upon the Wisconsin tax system. Theoretical and practical problems involved in tax legislation and administration are considered at length. Among the important problems examined are: relative tax burdens on individuals, corporations, and property in Wisconsin and neighboring states; good and bad taxes; income, inheritance, property, motor vehicle, and sales taxation. Extended study is made of the growth and importance of public debts and

expenditures. The effects of taxation on business, on distribution of wealth, and on society in general are surveyed. The course closes with a discussion of suggested reforms in our tax system.

Psychology of Human Behavior.

This course is designed to aid one in the understanding and control of human nature. It aims particularly to meet the interest of the practical layman. Among the topics covered are: the scientific approach to the study of human behavior; the effect of fatigue, alcohol, drugs, tobacco, lack of sleep, temperature, faulty ventilation, climate, and the seasons on behavior; the study of abnormal psychology, including a consideration of the major psychoses particularly from the viewpoint of how they throw light upon normal behavior.

A detailed consideration is given to the phenomenon of conflict and resulting dissociation, including hysteria, logic-tight compartments, rationalization, double personalities, automatic writing, hypnosis, delinquency, and crime.

The latter part of the course at times is approached through child psychology; finally mental hygiene is emphasized.

Social and Literary America.

Through a series of lectures and selected readings, this course traces the principal currents in American social, economic, and intellectual life as reflected in American literature. Students of both history and literature have come to realize that the literature of a people cannot be adequately understood unless examined in the light of the time in which it was produced. The social changes and the life of the people are vividly and concretely mirrored in the literature of the period. Both American history and American literature take on a new significance when approached from this point of view.

TECHNICAL INSTITUTE COURSES

As a result of an extensive investigation of Engineering and Technical Education in Europe, the United States, and Canada, conducted by the Society for the Promotion of Engineering Education, American educators and industrialists have become aware of the fact that a type of educational facility highly developed and successful in Europe—the Technical Institute—is lacking in the American educational plan. The Technical Institutes of Europe are described as follows by Mr. W. E. Wickenden, formerly Director of Investigation for the Society for the Promotion of Engineering Education and now President of the Case School of Applied Science:

> "Through great diversity of name, organization, and program runs a common warp of distinctive characteristics; they are not trade schools, nor are they preparatory schools for higher studies; their courses are of terminal character and are intended for young men already oriented to industry, who wish intensive preparation for definite lines of advancement; most of the students are not bookminded; direct processes of teaching and learning are employed, and most of the student's work is done on the premises. The entire process is pointed to the higher practical pursuits of industry, rather than to its highly intellectual functions. In addition to engineering courses of a fairly general, though practical character, these schools provide nearly all the higher training in the technology of specific industries and training for particular technical functions."

It has long been recognized that there is a need in Wisconsin, especially in the Milwaukee industrial area, for an educational activity of the same general character as that of the Technical Institute, which trains young men for the semiprofessional fields which exist between the skilled craftsman and the trained professional engineer. Because of this need the University Extension Division of the University of Wisconsin is now offering at its Milwaukee Center several full day educational programs for those properly qualified young men who desire to enter one of the semiprofessional fields and thus spend less than the usual four-year period in academic training. The general idea of these educational programs, although patterned after the plan of the technical institutes, has been modified to meet existing conditions in Wisconsin and the United States.

At the present time there are available to young men a two-year full day program in **Building Design and Construction** and a one year course in **Radio Communication.**

The prerequisite for entrance to these courses is high school graduation or its substantial equivalent. The requirements of the course will be exacting and strenuous. Each applicant for admission will be judged solely on his ability to carry the work and to profit by it.

The method of instruction employed differs somewhat from the conventional method. Each student may start his course at a point in the work where his ability and previous training permit. It is possible for him to work

as slowly or as rapidly as he desires. Another feature of these courses is that the student is expected to do all of his work during the regular day periods under the supervision of the instructors. The instruction will be substantially of a collegiate grade and will be under the direction and supervision of properly qualified teachers who are also mature and experienced in the engineering technical fields.

The technical institute type of courses offered in Milwaukee aims to train young men for the so-called semiprofessions, those vast fields of activity between the skilled craftsmen and the trained professional engineers.

Entrance Requirements

Admission will not be based upon the number of years' attendance at school but upon evidence of the prospective student's ability to carry the work required in the course he is seeking to enter. The determination of these abilities will be in charge of the Bureau of Guidance and Counseling. In view of the fact that the instruction will be on a college level, the student is expected to have a high school education or its equivalent in practical experience, general information, and attainment.

The Bureau of Guidance and Counseling will hold a series of conferences with prospective students in order to determine their fitness to enter these courses. As a result of these conferences the student may expect his preparation and fitness to enter the course to be evaluated. He will be advised and will be expected to follow the procedure given below:

1. If he is equipped with more general knowledge, information, and skill than necessary for entrance, it will be possible for him to complete the course within a period less than that assigned.
2. If he meets the requirements, he may expect to complete the full course in the time allowed.
3. If he shows evidence of sufficient ability and previous training to profit by the course but lacks certain essential requirements, he will be expected to make up the deficiencies. This will usually require a longer period.
4. If he shows that his previous training and ability do not fit him for the particular course he wishes to enter, he may profit by following another line which will be suggested in conference.

A student should not hesitate to submit himself to these conferences because it is his purpose and the purpose of the institution to ascertain where his abilities and capacities lie, without reference to his previous school training.

Fees

The regular Extension fee of $5.00 per credit hour will be charged. Fifteen hours is usually a full course. Laboratory fees are in addition to this amount, depending upon the course.

Certificates

University of Wisconsin Extension Division certificates will be issued to those who have successfully completed a course of study in the Technical Institute. These certificates will be recognized in business and industry and by the public at large as standing for a very definite attainment.

Courses to Fit Individual Needs

In addition to the courses in **Building Design and Construction** and in **Radio Communication,** it is possible, by conferences with the members of the Guidance Bureau, to arrange special combination courses to suit individual needs. These special courses can be made up from the four other fields offered in the Milwaukee Center—Business, Letters and Science, Engineering, and Liberal Education.

TWO-YEAR DAY COURSE IN BUILDING DESIGN AND CONSTRUCTION

This specialized, intensive, two-year course gives training for positions connected with the design and construction of buildings. It is of particular interest to men who wish to become building inspectors, construction superintendents, structural or architectural draftsmen, or structural designers. The training given in this course will qualify the student for positions of substantial responsibility after a little practical experience. This is especially true if the student secures part-time employment along constructive lines while attending school. This experience will be of great value to him not only in securing a position after completing the course but also in getting a better understanding of the application of theory to practice.

LIST OF STUDIES

First Year

First Semester		Second Semester	
Mathematics 51 or 403M	5 rec.	Structural Theory 412M	6 rec.
Structural Theory 402M	5 rec.	Surveying 410M	3 rec.
Drawing 405M	6 lab.	Structural Drafting and Steel Handbook 413M	9 lab.
Concrete Work 407M	4 lab.	Matls. of Const. 415M	2 rec.

Second Year

Reinf. Concrete 420M 2 rec.	4 lab.	Reinf. Concrete 430M	9 lab.
Steel Buildings 421M 2 rec.	4 lab.	Contr. and Specif. 431M	1 rec.
Estimating 422M	2 rec.	Special Problems 434M	2 lab.
Foundations 423M	2 rec.	Roof Truss Design 432M	6 lab.
Stresses in Trusses 424M	3 lab.	Reports by Students	1 rec.
Construction Plant 425M	1 lab.	Inspection Trips 438M	1 lab.

DESCRIPTION OF COURSES

407M. Concrete Work. This is not a design course but comprises the development of scale working drawings of a concrete building, together with the treatment of excavations; placing concrete; placing steel; amount of materials per cubic yard of concrete; mixing; amount and size of lumber for form work; placing of forms; and many other topics.

425M. Construction Plant. Various problems regarding the size and location of the plant are discussed in the class. The class is taken to see plants in operation on various kinds of construction work.

431M. Contracts and Specifications. This subject covers the elementary principles of contracts and gives the student practice both in interpreting and writing specifications.

405M. Drawing. This subject covers the underlying principles of perspective, isometric, and orthographic projections, with illustrative problems and simple construction drawings. Students are required to work both on paper and tracing cloth.

422M. Estimating. Topics treated: the preparation of a quantity survey, covering such items as enter into the construction of a building; namely, concrete, brick, steel, and lumber. From practical problems, the students are required to make quantitative estimates covering the various branches of construction and to list the results in such a manner as to facilitate making a cost analysis.

423M. Foundations. The following are a few of the subjects treated: soil investigations; tests to determine soil conditions; bearing power of soils; excavations; general considerations; preliminary investigations; distribution of pressure; spread footings; timber; and concrete piles.

438M. Inspection Trips. The class is taken out from time to time to visit construction work of special interest. The student makes a written report on each trip.

415M. Materials of Construction. This is a short course giving the student the fundamentals regarding the production and manufacture of the ordinary materials used in construction.

51. Elementary Mathematical Analysis. This course is required of all freshmen in engineering. Applicants for admission will be required to pass an examination in algebra, given shortly after the opening of the semester. The course includes: functions, rectangular coordinates and the straight line; the power function; the circle and the circular functions; ellipse; hyperbola; single and simultaneous equations; permutations and combinations; binomial theorem; progressions. A thorough review is given at the close. The course gives prominence to the fundamental truths of elementary analysis. Graphing is emphasized.

Students who pass the regular examination given to all freshmen engineers are admitted to Mathematics 51. Students who do not pass the examination will be required to take Mathematics 403M.

403M. Mathematics. This is a special course planned to meet the needs of students who are not prepared to enter Mathematics 51 and includes both algebra and trigonometry. The following topics are treated: algebra: addition, subtraction, multiplication, and division; special products and factors; equations; fractions, formulas; equations with more

than one unknown; exponents, powers, and roots; and quadratic equations. Trigonometry: logarithms; angles, trigonometric functions; tables; right triangles; and oblique triangles.

420M. Reinforced Concrete. This course teaches the fundamentals regarding the design of reinforced concrete beams, slabs, and columns. The following are some of the topics treated: steel and concrete in combination; rectangular beams; web reinforcement; slabs; T-beams; beams with steel top and bottom; and columns.

430M. Reinforced Concrete. This subject is an application of the theory of the first semester's work in reinforced concrete. The student works out designs involving floors of various types, a roof panel, columns, various types of footings, and both gravity and reinforced retaining walls. Detail drawings are required.

Reports by Students. Two or more topics are assigned to each student during the semester. The topics are on various engineering subjects. Talks are prepared on the assigned subjects and presented before the class.

432M. Roof Truss Design. The complete design of two roof trusses is required, one of timber and the other of steel. Detail drawings are required.

434M. Special Problems. This subject includes work on stress-computations for trusses supported by columns, deflection in beams, some work on the deflection of trusses, wind bracing, and continuous beams.

421M. Steel Buildings. Many practical considerations in connection with the design of buildings are considered. Numerous designs are required with detail drawings. Floor designs with special attention to the economical arrangements of beams and girders are worked out.

424M. Stresses in Trusses. Stresses in different types of trusses due to various loadings are worked out by the student. Both the algebraic and graphic methods are used.

413M. Structural Drafting and Steel Handbook. The student starts with simple structural details which gradually become more complicated. The work conforms to standard drafting room practice. Tracings of some of the plates are required. The handbook of the American Institute of Steel Construction is used in connection with the work of this course.

402M. Structural Theory. This subject is a preparation for Structural Theory 412M given the second semester. Some of the topics treated are: forces; tension; compression; shear; unit stresses; rivets; modulus of elasticity; reactions; center of gravity; moment of inertia. The

handbook of the American Institute of Steel Construction is used in connection with the text. The use of the slide rule is also given, and the student is required to use it in solving the various problems.

412M. Structural Theory. The following are some of the topics treated: concurrent and non-concurrent forces; space and force diagrams; composition and resolution of forces; reactions; use of algebraic and graphical methods; shears and moments in beams; design of simple beams.

410M. Surveying.

Lab. fee, $2.25.

The first half of the semester is devoted to classroom work and the second half to outside problems. The student learns the use of the tape, level, and transit. After completing this course he should be able to run ordinary levels, give grade for construction, stake out building foundations, and estimate quantity of earthwork.

COURSES IN RADIO COMMUNICATION

There has been a long felt need in the radio field for a school of recognized standing that offers a complete and comprehensive course in Radio Communication which can be finished within a reasonable time. Realizing this need the University of Wisconsin Extension Division in Milwaukee is giving such a course to fit students for responsible positions in this field. This is a new type of training of a semi-professional nature on a college level, the object of which is to train young men for the positions which exist in that field between the skilled craftsman and the trained professional engineer.

Upon the successful completion of the course, the student is prepared to take the United States government examination for a Second Class Commercial Operator's License.

The holders of Second Class Operator's Licenses are eligible to work on any ship as prescribed by government regulations and in any broadcasting station. Many enter the movie-sound field and also the laboratories of manufacturers.

DESCRIPTION OF COURSES

The courses as outlined below cover the principles of radio telegraphy and telephony, together with correlated subjects necessary for a thorough understanding of the radio craft. The program is an exacting one, demanding six hours of class work and at least four hours of outside study every day.

First Semester

271M. Radio Communication—5 hours a week. The following subjects are covered:

Elements of Electricity: Electrostatics; magnetism; direct current; batteries; motors and generators; inductance; capacity; alternating currents; vector diagrams; meters.

Circuits: Series; parallel; series-parallel; resonance; filters; the transformer; coupling; types of receiving circuits.

Laboratory Experiments—3 hours a week. The laboratory is well equipped with modern apparatus for experimental and instructional work. The experiments follow the topics covered in the lectures, stressing the practical application of the principles involved. Measurements of resistance, inductance, capacity; making of characteristic curves of vacuum tubes; oscillator and wavemeter calibration; motor-generator tests; receiver circuit tests.

275M. Design Problems—4 hours a week. These problems involve the calculation of all values, such as size of wire, number of turns, size of core of various parts of a receiver, namely, the power transformer, voltage divider, filter system, audio amplifier, radio amplifier. Similar calculations are also made for a wavemeter and an oscillator.

277M. Technical English—2 hours a week. The essentials of English pertaining to the engineer's use are taught in this course. The course includes the taking of notes and the making of outlines on lectures and reading; the writing of reports on experiments, on special investigations, and on outside reading.

278M. Technical Mathematics—5 hours a week. The essential phases of mathematics pertaining to the entire list of studies given above, with appropriate applications and numerous problems, are covered in this course.

281M. Code, Sending and Receiving—10 hours a week. Two hours' drill is given every day from eight to ten in sending and receiving the International Morse Code. The code room is equipped with a Boehme Automatic Transmitter which sends from a perforated tape. This assures perfect, uniform characters at any desired speed. A Teletype Perforator is also part of the equipment, so that exercises can be cut on a tape for class or individual drill. A speed of 22 words a minute of straight copy and of 18 words a minute of mixed charactors is required for graduation, although the government requires only 20 and 16, respectively. There is adequate instruction in message forms, "Q" signals, the handling of traffic, and governmental laws and regulations.

Second Semester

272M. Radio Communication—5 hours a week. The following subjects are covered:

Vacuum Tubes: General theory; two, three, four, and five elements; hot and cold cathode rectifiers; mercury vapor tubes; amplifier; detector; oscillator; photo-electric cell.

Radio Reception: General principles; audio and radio frequency amplification; regeneration; tuned radio frequency; superheterodyne; types of A. C. sets; commercial receivers; auxiliary apparatus—power supply, speakers; phonograph combinations; interference.

Radio Telegraphy: General theory and principles; amateur apparatus; commercial apparatus—spark, arc, alternators, vacuum tube sets; power supply; amplifiers.

Radio Telephony: General theory and principles; microphones; modulation; speech input equipment.

Transmitting Tubes: Types and characteristics.

Wave Propagation and Reception: Types of antennae.

Direction Finders.

Review of Entire Course (last six weeks)

Laboratory Experiments—6 hours a week. Advanced work on measurements, calibration, vacuum tubes, tuning and testing of transmitters.

282M. Code, Sending and Receiving—12 hours a week. Continuation of first semester with special emphasis on speed, accuracy, and technique; message forms and regulations.

276M. Design Problems—2 hours a week. Continuation of first semester's work.

CORRESPONDENCE-STUDY COURSES

The Correspondence-Study Courses offered by the University of Wisconsin, from Madison, provide individual instruction adapted to the special needs of each student. These courses, prepared and conducted by members of the University faculty, may be undertaken in the student's leisure hours at his home. Through them the University and the home are brought into close relationship; and through them also everyone in the State is given an opportunity to obtain the highest education possible at the smallest practical expense. They may be grouped as follows:

1. **Regular university studies** which may be taken for credit toward a degree.
2. **Advanced courses** designed to help graduates and others already in professional or practical life to keep in touch with the advancement in science and other fields of knowledge.
3. **High school and preparatory studies** for those for whom residence study is not available or practicable.
4. **Vocational courses** which supply knowledge and training in business, industrial, and professional fields.
5. **Elementary and grammar school studies** for adults who need such instruction for practical purposes.
6. **Review Courses.**

Over 400 courses are offered, some of which are listed below:

General	Business	Engineering
Botany	Accounting	Aeronautics
Chemistry	Advertising	Architectural
Education	Auditing	Automotive
English	Bookkeeping	Chemical
Modern Languages	Bus. Administration	Civil
General Science	Bus. Correspondence	Concrete
Geography	Business Law	Drafting
High School Subjects	Cost Accounting	Electrical
History	Economics	Heating and Ventilating
Home Economics	Elements of Money & Banking	Mathematics
Library Methods	Freehand Lettering	Mechanical
Industrial Arts	Income Tax	Railroad
Mathematics	Retail Selling	Structural
Music	Show-Card Writing	Surveying
Pharmacy	Store Management	Telephony
Philosophy		
Sociology		

For detailed information, call at the University Extension Division, The University of Wisconsin, 623 West State Street, Milwaukee, Wisconsin, or telephone Marquette 7051.

Or write to the University Extension Division, the University of Wisconsin, Madison, Wisconsin.

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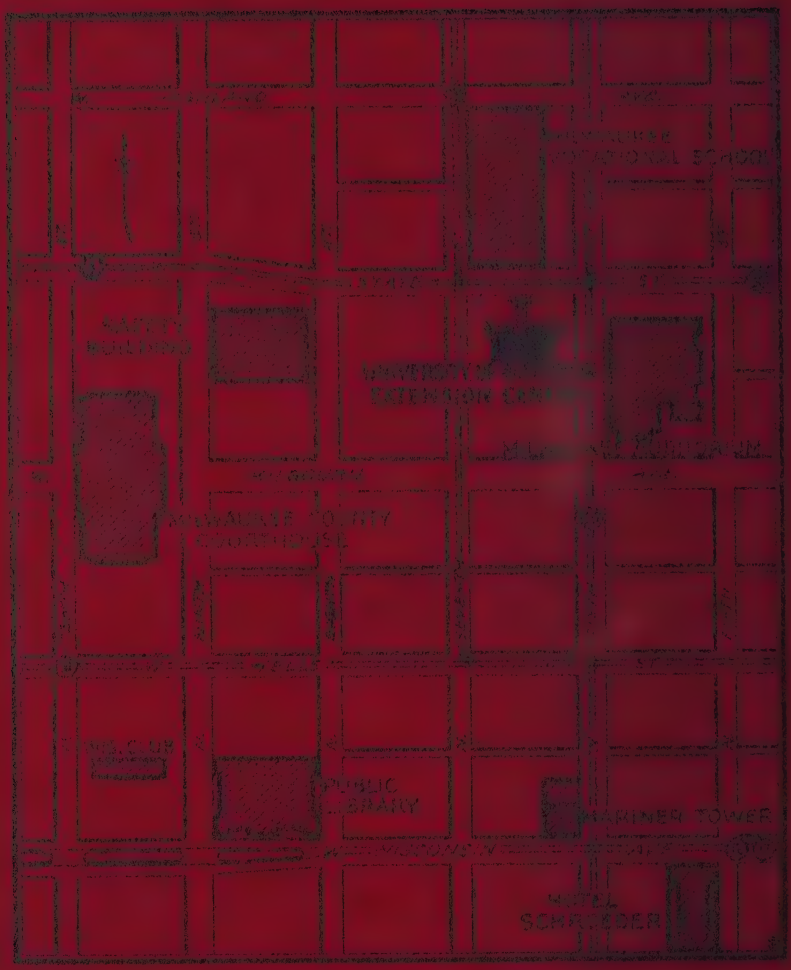
BULLETIN OF
THE UNIVERSITY OF WISCONSIN

THE UNIVERSITY EXTENSION CENTER IN MILWAUKEE

Business
Engineering
Letters and Science
Liberal Education
Technical Institute

THE UNIVERSITY OF WISCONSIN
UNIVERSITY EXTENSION DIVISION
623 W. State Street Marquette 7051
Milwaukee, Wisconsin



LOCATION OF MILWAUKEE CENTER

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UNIVERSITY EXTENSION CENTER
IN
MILWAUKEE

Business
Engineering
Letters and Science
Liberal Education
Technical Institute

1936 - 1938

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BULLETIN OF
THE UNIVERSITY OF WISCONSIN

1936

JANUARY

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CALENDAR

1936-37

DAY CLASSES

FIRST SEMESTER

September 15	Tuesday, 2 p.m.	Freshman meeting; attendance required
September 16, 17	Wednesday, Thursday 9-11 a.m.; 2-4 p.m.	Registration days
September 21	Monday	Instruction begins
September 26	Saturday, 9 a.m.	Condition examinations
September 26	Saturday evening	Faculty-Student Reception
November 26-29 incl.		Thanksgiving recess
December 19 (noon)-January 3 incl.		Christmas recess
January 16	Saturday, 9 a.m.	Condition examinations
January 25-30 incl.	Monday-Saturday	Final examinations

SECOND SEMESTER

February 4, 5	Thursday, Friday 9-11 a.m.; 2-4 p.m.	Registration days
February 8	Monday	Instruction begins
February 22	Monday	Washington's birthday; legal holiday
March 20 (noon)-March 28 incl.		Spring recess
April 24	Saturday	Science Exhibit
May 1	Saturday, 9 a.m.	Condition examinations
May 21 and 22	Friday-Saturday	Mathematics Exhibit
May (30) 31	(Sunday) Monday	Memorial Day: legal holiday
June 7-12 incl.	Monday-Saturday	Final examinations

EVENING CLASSES

FIRST SEMESTER

September 14-19 incl.	Monday-Saturday	Registration days
September 21	Monday	Instruction begins
November 26	Thursday	Thanksgiving day; legal holiday
December 19-January 3 incl.		Christmas recess
January 25-29 incl.	Monday-Friday	Final examinations

SECOND SEMESTER

February 1-6 incl.	Monday-Saturday	Registration days
February 8	Monday	Instruction begins
March 20-28 incl.		Spring recess
June 7-11 incl.	Monday-Friday	Final examinations

NOTE: Evening classes will be held on February 22 and May 31.

UNIVERSITY EXTENSION CENTER, MILWAUKEE

General Administrative Staff

Glenn Frank, M.A., Litt.D., L.H.D., LL.D., President of the University
Frank O. Holt, Ph.M., D.Ped., Dean, University Extension Division

Milwaukee Administrative Staff

Charles M. Purin, Ph.D., Director
George A. Parkinson, Ph.D., In Charge of Evening Classes
Irene Langwill, BA., Recorder
Dean Frank O. Holt, D.Ped., Adviser to Men
Florence C. Stehn, M.A., Adviser to Women

Harry T. Avey, M.E., Superintendent of Building
Myron J. Lowe, Field Representative
Elsa L. Jaeck, B.A., Librarian

Milwaukee Office Staff

Elizabeth Lookatch, Secretary to Director
Viola Schroeder, B.A., Assistant Recorder

Alfrieda Fromstein
Hugo Maechler
Grace Gore Nourse
Helen Searl
Myrtle A. Volger
Gladys Wagner

Instructional Staff

Full-Time Faculty

Alexander, John W., B.S., Instructor in Chemistry
Avey, Harry T., M.E., Associate Professor of Mechanical Engineering
Babcock, Mary R., M.A., Instructor in English
Baier, Joseph G., Ph.D., Assistant Professor of Zoology
Baldwin, Leo S., B.A., B.S., Assistant Professor of Drawing
Bardell, Ross H., Ph.D., Instructor in Mathematics and Astronomy
Bell, Earl R., M.A., Instructor in Physics

Brooks, Dudley C., M.A., Instructor in English
Creamer, John J., B.A., LL.B., Associate Professor of English
Deptula, Szymon St., M.A., Instructor in Polish
Doering, Helmuth R., B.A., M.B.A., Assistant Professor of Business Administration
Drake, Lewis E., Ph.D., Assistant Professor of Psychology
Fuller, William J., B.A., Professor of Civil and Structural Engineering
Goese, Melvin A., B.S., Instructor in Chemistry
Grant, Hiram E., B.S., Instructor in Mechanical Drawing
Hayes, Merlin L., Ph.D., Instructor in Botany and Zoology
Hjermstad, Hans, Instructor in Radio
Holmes, Mrs. Elisabeth K., M.A., Assistant Professor of English
Hunt, George T., Ph.D., Instructor in History
Hursley, Frank M., M.A., Assistant Professor of English
Judson, Lyman S., Ph.D., Assistant Professor of Speech
Kopp, George A., Ph.D., Assistant Professor of Speech (On leave, 1936-37)
Krueger, Hilmar C., Ph.D., Assistant Professor of History
Kunze, Harry L., M.A., J.D., C.PA., Assistant Professor of Accounting
Lawrence, Lee E., Ph.D,, Instructor in History and Political Science
Marden, Morris, Ph.D., Assistant Professor of Mathematics
Martin, Miles J., Ph.D., Associate Professor of Physics
Millington, Paul E., Ph.D., Assistant Professor of Chemistry
Morrison, R. Felix, M.A., Instructor in English
Nordhaus, Edward A., M.S., Instructor in Mathematics
Parkinson, George A., Ph.D., Associate Professor of Mathematics
Person, Philip H., Ph.D., Associate Professor of Sociology
Purin, Charles M., Ph.D., Professor of German
Reinders, Victor A., Ph.D., Instructor in Chemistry
Roth, William E., Ph.D., Assistant Professor of Mathematics
Rouse, T. Alton, Ph.D., Assistant Professor of Physics
Sauer, Hans, Instructor in Radio
Schnaitter, M. R., M.A., Associate Professor of Economics
Stehn, Mrs. Florence C., M.A., Assistant Professor of French
Steinfort, Meta M., M.A., Associate Professor of Spanish
Torinus, Gracia E., (Mrs. R. Blake) M.A., Instructor in English
Town, George G., Ph.D., Professor of Chemistry
Vass, John I., Ph.D., Instructor in Mathematics
Voigt, Mrs. Frieda A., B.A., Instructor in German
Walker, Ruth I., Ph.D., Assistant Professor of Botany
Webster, Herbert T., Ph.D., Instructor in English
Weidman, Robert H., Ph.D., Instructor in French and German
Wesle, Herbert W., B.S., Associate Professor of Topographic Engineering
Wilda, EuGene, B.S., Instructor in Chemistry
Wolf, Louise A., Ph.D., Instructor in Mathematics
Young, Charles E., Ph.D., Professor of Romance Languages

THE UNIVERSITY EXTENSION CENTER IN MILWAUKEE

Over 50 per cent of the people of Wisconsin live in the 20 eastern counties centering around the city of Milwaukee, which comprises only 17 per cent of the territory of the state. Over one-fifth of the people of the state live in Milwaukee county. The Regents of the University, therefore, decided that if the Extension Division were to serve effectively this heavily populated section, an extension center would have to be developed in the city of Milwaukee. Rented headquarters were first established in 1908. Through all the years the only program of service developed there has been extension classes. (Other state-wide services of the Extension Division as carried on from central headquarters at Madison are described on page 122.)

After the World War the federal and state government requested the Extension Division to establish in Milwaukee a curriculum of freshman and sophomore courses in Letters and Science, Commerce, and Engineering for returned veterans whose tuition was to be paid by the government. This was done, and the courses became so popular that a number of Milwaukee parents requested the University to allow their sons and daughters, then graduating from high school and unable financially to go to Madison, to take these courses along with the veterans, and receive college credit. Permission was granted, and in 1923 the Regents of the University offered these freshman and sophomore extension courses to be made available to the graduate of any accredited high school in Wisconsin.

In 1921 the Legislature appointed an interim committee to make a special study of the Milwaukee extension situation, and of the need for a state-owned building. This committee made a printed report of its findings to the 1923 Legislature and recommended an appropriation of $150,000 for an Extension building in Milwaukee, which recommendation was enacted into law in 1925. The 1927 Legislature, after a full hearing by its joint finance committee, voted an additional $175,000 in order to build a building large enough to care for the actual needs. During the 1925 Legislature the State Attorney-General, when requested for a ruling, reported that the University Extension program in Milwaukee and the proposed building were legal and constitutional. From that day to this no policy has been altered that might in any way invalidate this ruling. While in the day classes there has been a normal growth in the number of students taking freshman and sophomore credit courses, in the evening classes the demand is more for the non-credit courses in liberal education and in those business and engineering subjects on a college level which fit one for progress in the industrial world.

One of the reasons why the classes in Milwaukee have been so popular is the fact that they are meeting the need of adults who must work for a living while trying to get an education. Milwaukee, being the largest

city in Wisconsin, offers a great variety of opportunities for adults to find full or part time employment while taking these courses.

The adult who has already passed the school and college age, who must work and earn his living and in many cases provide at the same time for a family, cannot carry a full residence program of studies. Colleges make out their schedules and curricula to meet the needs of full-time, relatively young students. The class program at the University Extension Division in Milwaukee, on the other hand, is organized to meet the special requirements of adults who are already in the practical work of life. The Extension Division offers courses in the morning, afternoon, late afternoon, and evening, so that an adult may attend classes at any period when he is not working. Since classes in the Extension building are held from eight o'clock in the morning until nine-thirty at night, or for thirteen and one-half hours a day, it is probably the most efficiently used college classroom building in the country.

The building was completed during the summer of 1928. It comprises seven stories and contains twenty-five classrooms and lecture halls, six science laboratories (physics, chemistry (2), biology, engineering, and radio), and a spacious library and reading room.

The kind of institution which the University of Wisconsin Extension Division is developing in Milwaukee is one that can organize a program of study to meet the needs of the individual rather than one that forces the individual to follow a regular curriculum. Among those whose needs are given special attention are the following:

The student who must work and earn part or all of his expenses while taking courses.

The individual who wishes to have a special program of studies suggested by faculty advisers to fit his particular needs and abilities.

The adult who wishes to select his own courses without reference to credit toward a degree or the securing of a certificate.

The student who can afford to devote only two years to preparation for a position that requires college training.

The high school graduate who wishes to do his first two years of college work in an institution near home.

The adult who wishes to broaden his education along lines of his own choice for purposes of self-improvement, intelligent citizenship, and general culture.

GENERAL INFORMATION

LOCATION

Classes are held in the University Extension building at 623 W. State Street, opposite the Milwaukee Vocational School and the City Auditorium. The twenty-five classrooms and lecture halls which this building affords, together with its library and six science laboratories, enable the Extension Division to offer a complete program of studies

OPPORTUNITIES FOR WORK

Since this institution offers morning, afternoon, and evening classes, it is possible for students to arrange to take work for University credit at convenient hours Students expecting to earn their way through college are allowed to carry a reduced program of studies upon the approval of the scholarship committee. Milwaukee, being the largest city in Wisconsin, offers a great variety of opportunities for high school graduates to come there from various parts of the State and find part time employment in many large industrial and business concerns

REDUCED PROGRAMS

Students in Day Classes are expected to take the full program of the course elected. Applications for reduced programs are approved by the scholarship committee only when the student can show legitimate reasons for the reduction.

GUIDANCE AND COUNSELING

The University of Wisconsin Extension Center emphasizes individual attention to students. This work is carried on by the Guidance Staff. Each student is assigned to a counselor as soon as he enters. With his counselor he can discuss his academic and personal problems as they arise and work out a curriculum that best suits his needs. This is made possible by the varied types of work offered, which include courses in Business, Engineering, Letters and Science, and Liberal Education, and special courses in the Technical Institute.

The services of the Guidance Staff are available to high school graduates without cost during the month of August. Students and their parents are invited to arrange for an appointment during this period.

REGISTRATION

Registration consists of filling out the necessary blanks provided at the office and the payment of fees for the courses taken. **The student is not placed on the class roll until he has complied with this rule.**

For dates of registration, see calendar on page 3. The office is open from 8:00 a.m. to 5:00 p.m. and from 6:45 to 9:30 p.m. on all weekdays except Saturday, and from 8:30 to 12:00 noon on Saturday. During the registration period the office is open continuously from 8:00 a.m. to 8:30 p.m. on all weekdays except Saturday and on Saturday from 8:30 a.m. to 3:00 p.m.

FEES

A fee of five dollars ($5.00) a credit hour is charged for all university credit work in the Extension Division. Laboratory fees and textbooks are additional. The fee for non-credit courses is specified in the bulletins describing these courses.

All fees are payable at the time of registration. One dollar ($1.00) is charged for late registration in the day classes and in the evening classes.

DEFERRED PAYMENTS

In day classes arrangements may be made for the payment of fees in three installments. Under this plan one-third of the amount of tuition, all laboratory fees, and an extra charge of $3 must be paid at the time of registration.

Evening class fees amounting to more than $10 may be paid in two installments. One-half of the total amount plus an extra charge of $1 must be paid at the time of registration.

ATTENDANCE

Day Classes

It is expected that every student will be present at all the meetings of the classes in which he is enrolled. Any student who at the date of the mid-semester examination in any course has been absent from more than five per cent of the total number of meetings to be held during that semester and who fails to pass said mid-semester examination may be required to drop the course with failure. Any student whose percentage of absence for any semester in any course exceeds ten per cent of the total number of meetings scheduled for that course may be excluded from the final examination and given a condition.

Absence from a recitation immediately preceding or following the Thanksgiving or Christmas or Spring Recess shall count as two ordinary absences.

Absence from a quiz section carries a grade of zero for the period covered by that quiz section unless the work is made up to the satisfaction of the instructor concerned.

Evening Classes

Students desiring University credit are not allowed more than two absences a semester in any two-credit course. Those having absences in

excess of that number shall satisfy the instructor that the work has been made up by special examination or otherwise before credit is given. In certificate courses four absences are allowed. Absences in excess of this number are to be made up in a manner similar to the procedure as outlined above for credit courses.

All students who receive credit toward a degree or a certificate must take the final examination and make a minimum grade of 70 per cent for the course.

CHANGE OF STUDIES AND DROPPING STUDIES

Day Classes

A student who wishes to make a change in his schedule of studies must secure the written approval of his counselor and of the head of the department concerned.

A student who drops a subject without written permission secured in advance will receive a failure in that study and may be subject to further discipline by the faculty.

DEFICIENCIES

Failures

In general, a student who has failed in any required subject must remove the failure by repeating that subject in class as soon as it is again offered and securing a passing grade.

Conditions

The grade of condition is given to a student who has carried a subject throughout a semester with a passing average, but who, failing in his final examination, reduces his semester average to some numerical standing between 60 and 69. In order to remove a condition a student must pass a special examination during his next succeeding semester of residence or it becomes a failure. If, in a course involving both laboratory and classroom work, the condition has been incurred on account of unsatisfactory laboratory or report work, it may be removed by absolving such substantial requirements as the instructor in charge of the course may prescribe. The removal of this type of condition will take effect on the official date for the removal of conditions.

For dates for the removal of conditions, see calendar, page 3. Applications for these examinations must be made to the Recorder ten days before the date given.

REFUNDS

Day Classes

Partial refunds to students withdrawing from the day classes are made upon the following basis if written notice is given at the time of

withdrawal: within two weeks from the first day of instruction, 80% refund; within four weeks, 60%; within six weeks, 40%; within eight weeks, 20%; after eight weeks, no refund. The late registration fee and the additional fee for deferred payments are not refundable.

Evening Classes

All applications for refunds must be made in writing.

In cases where a class is discontinued or the meeting day of the class is changed after a student has registered, the entire amount of the fees paid will be refunded upon the written application of the student.

Applications for cash refunds not covered by the preceding paragraph must be made before noon of the third Saturday following the beginning of the class; a registration fee of 20% will be retained from each class fee. The late registration fee and the additional fee for deferred payments are not refundable.

A student withdrawing who notifies the office in writing during the period from the fourth to the sixth week inclusive after the beginning of the class will receive a credit memorandum card covering a fraction of the fee paid, according to the following schedule:

Fourth Week	75%
Fifth Week	70%
Sixth Week	65%

This card is not transferable except to a member of the immediate family of the person to whom it is issued and may be applied on a future enrollment provided it is used within two years from the date of issue.

The business office of the Milwaukee Center may in unusual cases extend the period indicated above for the granting of credit cards in instances where the student withdrew before the end of the sixth week of school but failed, for some unavoidable reason, to make application for a credit refund until after the end of the six-week period.

STUDENT ACTIVITIES

All student activities, such as student dances, Spotlight plays, etc., must terminate by the middle of May.

German Club

The German Club aims to acquaint its student members with Germany and its people and with the achievements of Germany in the fields of art, science, and literature. In addition it furnishes supplementary practice in language work. The club meets twice a month and is open to all students interested in the German language. Musical numbers, presentation of plays, recitations, short talks on cultural subjects, and singing of popular folk-songs make up the programs. Other meetings held during the year are

Student-Faculty Dinner Dance and Commencement Exercises

of a purely social character intended to promote good fellowship. Some of the meetings are open to the public.

Girls' Clubs

Girls' activities are promoted by two class clubs, the Freshman and the Sophomore. All girls are eligible and are urged to take part in whatever functions the girls plan for the year.

In addition to the class clubs there are two local sororities. Membership in these groups is by election only. Girls selected have additional opportunities to meet their colleagues in their homes as well as in their classrooms.

Mathematics Club

The Mathematics Club is an organization of the students who are interested in mathematics. The club holds monthly meetings at which papers are presented by students and members of the faculty. A portion of each meeting is spent in playing mathematical games and in the solution of mathematical puzzles. The purpose of the club is to stimulate the interest of students in mathematics by discussing many interesting phases of the subject which cannot be taken up in the classroom, and by showing the fundamental relation of mathematics to the other sciences.

For information about the Euler prize, see page 16.

Mathematics Exhibit

During the second semester, the Mathematics Club has an evening meeting to which it invites all members of high school mathematics clubs in the city. All other students interested in mathematics are welcome. The members present a program consisting of several talks on various topics in mathematics. Also, there is an exhibit of mathematical models, instruments, drawings, and computing machines. Many of the drawings and models are made by the students during the school year. For date, see calendar on page 3.

Photo Club

The Photo Club is a group of ambitious amateur photographers organized under the auspices of the Department of Physics. The purpose of the organization is to improve photographic techniques and to promote an interest in pictorial photography. Meetings are held twice each month, the programs consisting of discussions and demonstrations of photographic processes. An annual exhibit of the work of the club is held in the spring.

Polish Club

Membership is open to any student who is studying the Polish language or to any student of Polish parentage. It is the purpose of the club to give students an opportunity to study and discuss literature, sing folksongs, and to carry on a correspondence with college students in Poland who are studying the English language. The meetings are conducted on a social basis and are held once every two weeks.

Science Exhibit

The science exhibit is a biennial event consisting of an open house to which the general public is invited. Many striking and unusual experiments are demonstrated, and several scientific lectures are given. All science departments participate in making this a feature of unusual public interest. For date, see calendar, page 3.

Spanish Club

All students now studying Spanish as well as others who have studied Spanish in the past are eligible to membership. The members plan to hold monthly meetings with carefully prepared programs. Each program consists of two distinct parts: first, a formal program of special numbers such as talks, reports, music, dancing, dialogues or plays; second, a social program with informal group songs, games, and contests.

Spotlight Club

Students desiring experience in acting, producing, costuming, or writing plays are welcome in the Spotlight Club. A short dramatic program is

given at each of the weekly meetings, and two public programs are given each year.

Physical Activity Requirement[1]

The physical activity requirement may be met in one of two ways:

(1) Three hours a week of physical education work at a recognized gymnasium for at least 17 weeks a semester.

(2) Participation in any major sport at the Milwaukee Center to the extent of at least fifty-one hours a semester, with the consent of the coach.

Students expecting to receive physical education credif must enroll with the athletic committee at the beginning of the semester.

SCHOLARSHIP AWARDS

The Gamma Kappa Phi Fraternity awards a cup on which is engraved the name of the student who is voted each year by the faculty as having achieved a superior record in general scholarship and having shown school loyalty and fraternal spirit. In addition, a scholarship emblem is presented to the winner. Students competing for this honor must have taken at least three semesters' work at this institution.

A similar cup is awarded, through the courtesy of Mr. George Brumder, for superior work in German. The candidates competing for this award must have studied German at the Extension Division for at least two semesters and must have obtained not less than 28 credits in that year, with a minimum average of C.

Sophomore Honors and Sophomore High Honors are awarded by the faculty at the close of the year to those students who have made records similar to those required for obtaining the same honors at the University of Wisconsin.

A special award is granted each year to the sophomore who has the highest number of grade points per credit for two full years' work at the Extension Division.

Freshman Honors are awarded each year to three students having the highest number of grade points per credit for that year. The standing of the various students shall be computed upon the basis of their first semester grades and the mid-semester grades of the second semester. A student eligible for this award shall have carried a full schedule of work, that is to say, shall have completed a minimum of 28 credits of work by the end of the semester in which the award is made.

THE HENRY HARNISCHFEGER AWARD

Beginning with the academic year 1929-30, and extending over a period of ten consecutive years, an annual prize of fifty dollars is provided by the

[1] Students who transfer to the University at Madison with at least sophomore standing are automatically exempt from the physical activity requirement.

late Mr. Henry Harnischfeger of Milwaukee and his heirs for the best German essays. Candidates must have studied German in the high schools of Milwaukee (suburbs included), for at least four semesters. The prizes are awarded by a jury, consisting of three members, to the students writing the best German essays on an assigned topic. The date of the essay contest, which is held at the University Extension Center, 623 West State Street, will be communicated to the high school principals and their German staffs two weeks in advance.

THE EULER PRIZE IN MATHEMATICS

A prize is awarded annually at the commencement exercises in June for the best paper presented by a student before the Mathematics Club on a subject chosen by the student and approved by the Department of Mathematics. The prize is known as the Euler prize. If, in the opinion of the mathematics faculty, no paper is presented before the Mathematics Club which merits the awarding of the prize, no prize is awarded.

THE LIBRARY

The library contains approximately 8,500 books. It receives, currently, 90 periodicals of both general and technical interest.

The special collection presented to the library in 1929 by Mrs. Victor L. Berger consist of 800 books and pamphlets, principally in the German language.

Books may be drawn for home use for a two-week period, with the exception of reference books and books reserved by the faculty for supplementary reading. Reserve books are available for a two-hour period.

Library hours

8:30 a.m. -9:30 p.m. Monday—Friday
9:00 a.m. -12:00 a.m. Saturday

The library is closed during the summer.

LECTURE BUREAU

The University Extension Division in Madison strives to make its services readily available to societies, organizations, study groups, and the public. It maintains a special bureau through which arrangements may be made for lectures by members of its faculty. These lectures include discussions and demonstrations in many fields: astronomy, business, chemistry, child guidance, linguistics, literature, mathematics, physics, radio, travel, zoology.

Persons desiring speakers for clubs, assemblies, business or technical gatherings, or study groups should get in touch with the Bureau. The fee for the lecture may be arranged with the Bureau. Information regarding this service may be obtained by writing the Lecture Bureau, University Extension Division, Madison, Wisconsin.

THE CLINIC FOR THE CORRECTION OF SPEECH DEFECTS

PURPOSE

The purpose of the Speech Clinic of the University of Wisconsin Extension Division in Milwaukee is to diagnose and treat adults and children who have speech defects. The following are common examples of defects:

Foreign Accent. Individuals of foreign birth or those whose association brings them regularly in contact with foreign speech very often either substitute sounds in the English language for the correct ones, or are unable to pronounce certain sounds in English. Foreign accent can be corrected under proper direction. Instruction may be taken in class or privately.

Lisping. This is a habit generally formed in infancy in which the "s," "z," "th" sounds are not properly employed. It can be easily corrected.

Careless Speech. This includes the running together of words, hesitance, and many other bad speech habits.

Nasality. This includes: what is commonly known as talking through the nose; trouble due to obstruction in the nose; and cleft palate speech.

Faulty Articulation. The inability to produce certain sounds correctly causes faulty articulation. In childhood it is generally termed "baby talk."

Hoarseness and High Pitched Voices. Under this heading, which is more or less self-explanatory, is included certain abnormal vocal conditions of which the person so afflicted is often unaware.

Delayed Speech. The learning of speech is often retarded in an otherwise normal child, making training necessary to stimulate the development of language to a degree appropriate to the age of the child.

Stuttering. Probably the best known among lay people and most dreaded is this speech defect.

TREATMENT

The treatment suggested for speech defects depends upon the diagnosis. Usually a series of weekly appointments with individual instruction are suggested. At these appointments the student takes part in corrective exercises and is given directions for home practice. These treatments may be commenced or terminated at any time, depending upon the individual case.

STAFF

The staff consists of Dr. George A. Kopp, in charge of the Speech Clinic (on leave, 1936-37); Dr. Lyman S. Judson, in charge of the Speech Clinic, 1936-37; and Dr. Robert West, consultant.

REGISTRATION

Registration consists of filling out a registration blank and paying a $2.00 diagnosis fee at the Extension Building, any time after September 1.

FURTHER INFORMATION

The Speech Clinic staff welcomes conferences with any one wishing further information concerning the Clinic or speech defects. There will be no charge whatsoever for such information. Call Marquette 7051 for an appointment.

UNIVERSITY CREDIT COURSES

ADMISSION

REQUIREMENTS FOR ADMISSION BY CERTIFICATE

I. The usual means of gaining admission to the university is by presenting a certificate of graduation from an accredited four-year or an accredited senior-high school showing satisfaction of the underwritten requirements and bearing the principal's recommendation of the candidate's fitness for college. Graduates of four-year non-accredited schools in Wisconsin who have satisfied all the subject requirements for admission to the University may be admitted on probation, without examination, upon recommendation of the principal.

1. Definitions. A *unit* represents a norm of five class-periods per week in one field of study for a school year of at least 36 weeks. Two laboratory periods in a science or other subject are considered equivalent to one class period. In subjects not usually taught throughout an entire school year, a unit may be constructed by adding the respective time values of two related subjects.

Except in foreign language (see below), a *major* consists of three or more units in one field of study and a *minor* consists of two units in one field of study.

"Unrestricted" admission to the University is admission which opens to the student all colleges, courses, and fields of study to which freshmen are eligible and insures full freedom of choice among all the college majors and fields of specialization. "Restricted" admission opens to the student such colleges, courses, and fields of specialization as do not require high-school mathematics as background. It does not give admission to the College of Agriculture or the College of Engineering or the Course in Chemistry, and does not permit the student to major or specialize in chemistry, commerce, economics, mathematics, pharmacy, pre-medicine, philosophy, political science, psychology, or sociology, or in any of the other natural sciences including physical geography and geology, or to graduate from the School of Education with a major or minor in any of these fields.

2. Sixteen units are required of a graduate of a regular four-year high school for admission as a regular student to any college or course open to freshmen.

3. Admission of such graduate shall be based upon: (a) the completion of two majors and two minors selected from four of the fields in Group A (below); one of these majors shall be English and Speech

(unless the candidate offers a minor in foreign language, in which case a minor in English and Speech will suffice); and for "unrestricted" admission one major or minor shall be mathematics, *i.e.*, one unit of algebra and one unit of plane geometry, with an additional half-unit of algebra in the case of those who seek unqualified admission to the College of Engineering; and (b) the completion of the additional units necessary to make a total of sixteen units selected from Group A and Group B (below), with the provision that not more than six of the sixteen units may be presented from Group B. Pupils planning early in their high-school career to enter the College of Letters and Science or the College of Engineering are advised to present all sixteen units from Group A. Until further action by Faculty and Regents not more than two units in advanced applied music or, alternatively, in art will be accepted under Group A. (Broadly speaking advanced applied music may be provisionally defined as applied music based upon two years of preparation in band or orchestra, or equivalent preparation in chorus. The units in art shall be based upon adequate preparation in free-hand drawing in the grades or an equivalent.)

4. Graduates of high schools which maintain a senior-high-school division shall present twelve units from this division to include: (a) one major and two minors selected from three of the fields in Group A or four minors selected from four of the fields in Group A; one major or minor shall be in English and Speech, and for "unrestricted" admission one major or minor shall be mathematics (as described above) unless, before entering the senior-high-school, the entrant has completed one of the two units in mathematics specified in the preceding sub-section, in which case the completion of the second unit will suffice. (b) The remaining units shall be selected from Group A and Group B. (See advice in preceding sub-section.)

Fields of Study

Group A

English and Speech	Mathematics
Foreign Language	Natural Sciences
History and the Social Sciences	Advanced Applied Music or Art

Group B

Agriculture	Industrial Arts
Commercial Subjects	Mechanical Drawing
Home Economics	Optional (2 units)

5. The foreign languages accepted for admission are French, German, Greek, Hebrew, Italian, Latin, Norse, Polish, and Spanish. If foreign language is offered under Group A it must consist of at least a minor in one language. Three or more units in one foreign language or two units in each of two foreign languages shall constitute a major.

A single unit of foreign language (i.e., one unaccompanied by a foreign-language minor) may be offered as an optional subject under Group B. (Four units in one foreign language are preferable to two units in each of two foreign languages.)

6. "Restricted" standing may at any time at the option of the student be changed to "unrestricted" standing by the mastery, subsequent to high-school graduation, of the content of high-school algebra and plane geometry by private study, tutoring, or correspondence study. The University will not provide resident instruction in this preparatory work.

II. Graduates of Wisconsin high schools need not meet the above requirements if, on the combined basis of rank in graduating class and aptitude and achievement tests satisfactory to the University, they stand in the upper twenty-five per cent of the average freshman class entering the University and are recommended for college by the high-school principal; but their admission will necessarily be "restricted" unless their preparation includes the two units in mathematics. This does not apply to candidates for admission who have graduated from schools outside the state of Wisconsin.

OTHER METHODS OF ADMISSION

For information about admission on the adult special basis and admission upon examination apply to the Recorder, University Extension Division, Milwaukee.

UNDERGRADUATE CREDIT

The total number of credits that may be earned in the Extension Division combining instruction in day classes, evening classes, and correspondence can not total more than the equivalent of two years' credit in any curriculum.

Graduates of junior colleges or those who have finished two years of work at a four-year college are permitted to elect suitable courses of junior rank if they are offered at the Milwaukee Center. Such students may elect freshman or sophomore work if the requirements for the degree they seek include such work. The nature of this work will be determined by a committee of the faculty of the Milwaukee Center, and the amount is not to exceed two year-courses.

All candidates for degrees must expect to take their senior year in residence. The minimum residence requirements is 30 credits and 30 gradepoints, to be earned in at least two semesters at Madison (or six summer sessions, in no one of which may less than four credits be carried). All the requirements of the major subject must be met, including at least 15 credits and 15 gradepoints in advance work (in some departments 20) in residence. If application is made in advance, very exceptional cases may

be given special consideration by the dean or the executive committee of the College of Letters and Science.

Credits and Grade Points

Throughout this bulletin the courses marked with an asterisk (*) involve credit toward a university degree for properly qualified students. In order to receive a degree the student must have not only the number of credits required in the course which he is pursuing, but his studies must reach a certain average of excellence. This standard is fixed by the grade-point system, which requires for graduation from any course as many points as credits. The following table shows the University scale of grading, together with the number of points per credit for each grade:

Grade	Percentage Equivalent	Points per Credit
A (Excellent)	93-100	3
B (Good)	85- 92	2
C (Fair)	77- 84	1
D (Poor)	70- 76	0
Condition	60- 69	0
Failure	Below 60	0

A student in the general courses in Letters and Science who has received a grade of B in each subject of the preceding semester may take not to exceed 18 credits.

UNIVERSITY COURSES OF THE FRESHMAN AND SOPHOMORE YEARS

The University Extension Division offers freshman and sophomore programs of study in the following courses:

Chemistry	Pre-education
Engineering	Pre-journalism
Letters and Science	Pre-law
Pre-commerce	Pre-medicine

All of these courses are approved by the respective residence departments at Madison and carry full credit toward a university degree.

Students who plan to take Pharmacy, Home Economics, Music, Library Course, Physical Education, or Art Education should consult the recorder about adjustment of programs.

Students who expect to transfer to the School of Education are advised to adapt the requirements of the first two years of one of the General Courses to the requirements as stated on pages 24 and 25.

LETTERS AND SCIENCE CURRICULA

Recommended Sequences for Freshman and Sophomore Years
(For complete information about requirements, see bulletin of College of Letters and Science)

1. **B.A. General Course** (includes foreign language)

Freshman

		Credits per semester
English 1a-1b		3
Foreign language		3-4
Mathematics	Two of these are required, at least one to be taken in the freshman year.	3-4
Science		5
History		3
Physical activity requirement		.
		14-16

Two foreign languages may be elected if desired. Mechanical drawing (3 credits) may be elected if the student wishes to take only one study from the mathematic-science-history group in the freshman year.

Sophomore

	Credits per semester
English 30a-30b	3
or 33a-33b	2
Foreign language (if requirement has not been met)	3-4
Electives	?
Freshman requirements (if not met the first year)	?
	14-16

2. **Ph.B. General Course** (without foreign language requirement)

Freshman

		Credits per semester
English 1a-1b		3
Science	One or both of these or two sciences	5
Mathematics		3-4
Mathematics	Two of these are required, at least one to be taken in the freshman year.	3-4
History		3
Foreign lang.		3-4
Physical activity requirement		.
		14-16

Mechanical drawing (3 credits) may be elected in place of one subject in either of the groups specified above, provided the student takes the second subject in his sophomore year.

Sophomore

The study list for the sophomore year must include English 2, intermediate composition, two credits each semester, unless the student has passed an intermediate knowledge examination, or has completed successfully one year of foreign language in college. The study list must also include whatever subjects are necessary in order to complete the science-mathematics option and the history option commenced in the freshman year. If the philosophy and psychology option is chosen, work on it should commence during the sophomore year. In the event the foreign-language option has been met by examination, the student should have about twelve credits of free electives each semester of this year.

3. Chemistry Course (Leading to B.S. degree)

Freshman

	Credits per Semester
English 1a-1b	3
Chemistry 1a-1b and 3	5-6
German or French	3-4
Mathematics	3-4
Physical activity requirement	.
	16-17

Sophomore

	Credits per Semester
Chemistry 11a-11b	5
German or French	3-4
Physics 1a-1b	5
Mathematics 5a-5b	3
	16-17

4. (a) Pre-commerce Course (leading to B.A. degree)

Freshman

	Credits per semester
English 1a-1b	3
Foreign language	3-4
Mathematics[1]	4
Science 5 credits or History 3 or 5 credits	3-5
Physical activity requirement	.
	14-16

[1] Including Theory of Investment (Math. 7).

Sophomore

	Credits per semester
English 30a-30b	3
or 33a-33b	2
Foreign language	3-4
Economics 1a	4
Accounting (Econ. 8-9)	3-4
	15-16

(b) Pre-commerce Course (non-language, leading to Ph.B. degree)

Freshman

	Credits per semester
English 1a-1b	3
Mathematics[1]	4-3
Science	5 or 10
(History)	(3)
Physical activity requirement	.
	14-16

Sophomore

	Credits per semester
English 2a-2b[2]	2
Economics 1a	4
(History)	(2-3)
Accounting (Econ. 8-9)	3-4
	14-16

5. Pre-education Course (leading to B.S. degree in education).

Students who expect to transfer to the School of Education should select one of the following sequences:

Sequence I

A. No foreign language required

B. Required:

English composition, 10 credits (English 1 and 2)
History, 10 credits†
Social sciences, 6 credits‡
Mathematics or philosophy, 10 credits
Natural science, 20 credits in regular year courses§

[1] Including Theory of Investment (Math. 7).
[2] Not required if foreign language option for Ph.B. degree has been absolved.
† Must include a year course in European (Course 2 or 5) or American history.
‡ Political Science 1 or 7 (3 credits) and economics or sociology (3 credits).
§ Must include at least one semester course in the biological sciences, zoology being strongly recommended. It is recommended that the rest of the science requirement be met in the physical (non-biological) sciences.

Sequence II

A. Required:
Intermediate knowledge of one language

B. Required:
English composition, 6 credits; English literature, 4-6 credits
History, 6 credits†
Social sciences, 6 credits‡
Mathematics, 8 credits, or philosophy, 6 credits
Natural science, 10 credits in elementary survey courses or in regular year courses or in both§

Sequence III

A. Required:
Intermediate knowledge of one language

B. No English literature required
Required:
English composition, 6 credits
History, 6 or 10 credits†
Social sciences, 6 credits‡
Mathematics, 10 or 8 credits **or**
Philosophy, 10 or 6 credits
Natural science, 20 credits in regular year courses§

Sequence IV

A. Required:
Proficiency in one foreign language, **or**
Intermediate knowledge in two foreign languages, **or**
Intermediate knowledge in one foreign language plus 10 credits in literature courses in that language

B. Required:
English composition, 6 credits; English literature, 4-6 credits

Two of the following:

(a) history, 6 credits†; and social sciences, 6 credits‡

(b) mathematics, 8 credits

(c) natural sciences, 10 credits in elementary survey courses or in regular year courses or in both§

---

† Must include a year course in European (Course 2 or 5) or American history.
‡ Political Science 1 or 7 (3 credits) and economics or sociology (3 credits).
§ Must include at least one semester course in the biological sciences, zoology being strongly recommended. It is recommended that the rest of the science requirement be met in the physical (non-biological) sciences.

6. Pre-journalism Course (leading to B.A. degree)

Freshman

	Credits per semester
Journalism 1a-1b	1
English 1a-1b	3
Foreign language (one or two)	3-8
History 1a-1b, 2a-2b, 5a-5b, or 10a-10b	3
Science or Mathematics	5-4
Physical activity requirement	
	15-16

Sophomore

	Credits per semester
English 30a-30b	3
Economics 1a-1b	4
Electives Recommended: Political Science 7; History 4; Psychology[1]	8-9
	15-16

7. Pre-legal Course

Same as either Curriculum 1 or 2 above.

Note: Three years of undergraduate work in Engineering is accepted for admission to the Law School, provided it includes 6 credits in Social Sciences.

8. (a) Premedical Course (leading to B.A. degree)[1]

Freshman

First Semester	Credits	Second Semester	Credits
English 1a	3	English 1b	3
Chemistry 1a	5	Chemistry 1b	5
French or German	3-4	French or German	3-4
History or Mathematics	3-4	History or Mathematics	3-4
Physical activity requirement		Physical activity requirement	
	15-16		15-16

Sophomore

English 30a or 33a	3-2	English 30b or 33b	3-2
Chemistry 20a, 21a	4	Chemistry 20b, 21b	4
French or German	3-4	French or German	3-4
Zoology 1—Animal Biology	5	Zoology 104	5
	15-16		15-16

[1] Premedical students entering the second semester substitute Zoology 1 (Animal Biology) for Chemistry 1a in their curriculum.

(b) Premedical Course (leading to B.S. degree)[1]

Freshman

First Semester	Credits	Second Semester	Credits
English 1a	3	English 1b	3
Chemistry 1a	5	Chemistry 1b	5
French or German	3-4	French or German	3-4
Mathematics	4-3	Mathematics	4-3
Physical activity requirement		Physical activity requirement	
	15-16		15-16

Sophomore

Chemistry 20a, 21a	4	Chemistry 20b, 21b	4
French or German	3-4	French or German	3-4
Zoology 1—Animal Biology	5	Zoology 104	5
Electives	3	Electives	3
	15-16		15-16

PRE-FORESTRY PROGRAM

The subjects listed below correspond closely to the requirements of the forestry courses offered by institutions in other states. Since many schools require attendance at a camp during the summer following the sophomore year, students are advised to consult at an early date the institution to which they plan to transfer.

Freshman

First Semester	Credits	Second Semester	Credits
English 1a	3	English 1b	3
Mathematics 1	4	Mathematics 2	4
Botany 1	5	Botany 2	5
Topographic Engr. 1	2	Topographic Engr. 2	2
	14		14

Sophomore

Economics 1a	4	Economics 1b†	4
Chemistry 2a	4	Chemistry 2b	4
Topographic Engr. 3	3	Zoology 1	5
Elective	4-5	Drawing 1	3
	15-16		16

[1] Premedical students entering the second semester substitute Zoology 1 (Animal Biology) for Chemistry 1a in their curriculum.

† A course in history or social science may be substituted for Economics 1b.

Desirable electives include:

Physics 1a, 1b
Geography
English 30 or 33
Speech 1, 2, 8

ENGINEERING CURRICULA

Leading to the Degree of Bachelor of Science

Freshman Lectures

A course of lectures is provided for freshman engineers. A few of these lectures will be on subjects of general interest. For the most part, however, the lectures will give the student an idea of some of the problems of the engineer in practice. This series of lectures should help him to realize that the various courses of study are each a necessary part of his training.

Some of the lectures will be given by members of the University staff; others by prominent engineers and by representatives of industry.

All freshman engineers are required to attend these lectures.

Civil Engineering

Freshman

First Semester

	Credits
Math. 51—Elementary analysis	5
Draw. 1—Elements of drawing	3
Chem. 2a—General chemistry	4
Engl. 1a—Freshman English	3
Top. Engr. 1—Elementary surveying	2
Freshman lectures	0
Physical activity requirement	0
	17

Second Semester

	Credits
Math. 52—Elementary analysis	5
Draw. 2—Elements of drawing	3
Chem. 2b—General chemistry	4
Engl. 1b—Freshman English	3
Top. Engr. 2—Elementary surveying	2
Freshman lectures	0
Physical activity requirement	0
	17

Sophomore

	Credits
Math. 54—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5
Top. Engr. 3—Land surveying	3
Ry. Engr. 1—Railway curves	2
Ry. Engr. 2—Route surveying	3
	17

	Credits
Math. 55—Integral calculus	4
Physics 52—Lectures and lab. practice	5
Mechanics 1, 2—Statics, dynamics	5
Top. Engr. 104—Advanced surveying and mapping	3
	17

Mechanical Engineering

Freshman

First Semester

	Credits
Math. 51—Elementary analysis	5
Engl. 1a—Freshman English	3
Draw. 1—Elements of drawing	3
Chem. 2a—General chemistry	4
Non-professional elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Second Semester

	Credits
Math. 52—Elementary analysis	5
Engl. 1b—Freshman English	3
Draw. 2—Elements of drawing	3
Chem. 2b—General chemistry	4
Non-professional elective	2
Freshman lectures	0
Physical activity requirements	0
	17

Sophomore

	Credits
Math. 54—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5
Mach. Des. 1—Mechanism	4
Draw. 3—Descriptive geometry	3
Non-professional elective	2
	18

	Credits
Math. 55—Integral calculus	4
Physics 52—Lectures and lab. practice	5
Mach. Des. 2—Design practice	1
Mechanics 1, 2—Statics, dynamics	5
Non-professional elective	2
	17

Electrical Engineering

Freshman

First Semester	Credits
Math. 51—Elementary analysis	5
Engl. 1a—Freshman English	3
Draw. 1—Elements of drawing	3
Chem. 2a—General chemistry	4
Speech 8—Extempore speaking	2
Freshman lectures	0
Physical activity requirement	0
	17

Second Semester	Credits
Math. 52—Elementary analysis	5
Engl. 1b—Freshman English	3
Draw. 2—Elements of drawing	3
Chem. 2b—General chemistry	4
Non-professional elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Sophomore

First Semester	Credits
Math. 54—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5
Draw. 3—Descriptive geometry	3
Econ. 1a—Elements of economics	4
Elective	2-4
	18-20

Second Semester	Credits
Math. 55—Integral calculus	4
Physics 52—Lectures and lab. practice	5
Mechanics 1, 2—Statics, dynamics	5
Top. Engr. 108 (elective)	3
	17

Chemical Engineering

Freshman

First Semester	Credits
Math. 51—Elementary analysis	5
Engl. 1a—Freshman English	3
Draw. 1—Elements of drawing	3
Chem. 2a—General chemistry	4
Elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Second Semester	Credits
Math. 52—Elementary analysis	5
Engl. 1b—Freshman English	3
Draw. 2—Elements of drawing	3
Chem. 2b—General chemistry	4
Elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Sophomore

	Credits
Math. 54—Differential and integral calculus	4
Chem. 14—Quantitative analysis	5
Physics 51—Lectures and lab. practice	5
Mach. Des. 1—Mechanism	4
	18

	Credits
Math. 55—Integral calculus	4
Elective	4
Physics 52—Lectures and lab. practice	5
Mechanics 1, 2—Statics, dynamics	5
	18

Mining Engineering, Metallurgical Engineering

Freshman

First Semester	Credits
Math. 51—Elementary analysis	5
Engl. 1a—Freshman English	3
Draw. 1—Elements of drawing	3
Chem. 2a—General chemistry	4
Elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Second Semester	Credits
Math. 52—Elementary analysis	5
Engl. 1b—Freshman English	3
Draw. 2—Elements of drawing	3
Chem. 2b—General chemistry	4
Top. Engr. 108—Short course in surveying	3
Freshman lectures	0
Physical activity requirement	0
	18

Students who wish to complete the chemical engineering, mining engineering, or metallurgical engineering courses in four years are advised to transfer to the College of Engineering at Madison at the beginning of the sophomore year.

EVENING CERTIFICATE COURSES

BUSINESS

The completion of a well-rounded program of study is of much greater benefit to the student of Business than the taking of separate courses at random. Realizing this, the University of Wisconsin, through the Extension Division, will give a special certificate to young men and women who satisfactorily complete a series of related courses in any one of six special fields. The certificate may be earned in Accounting, in Marketing and Advertising, in Finance and Credit, in Industrial Management, in General Business, or in Secretarial Work. For certificate courses in Real Estate, see page 33.

In order to secure a certificate, a student must have completed satisfactorily twenty-four semester hours (ordinarily twelve courses) in one of the six special fields in which certificates are granted, including all the required courses and certain elective courses. **No course is completed unless a final examination is taken.** The special requirements for each group are listed below.

To complete the requirements for a certificate in three years, it will be necessary, ordinarily, for the student to attend classes on an average of two evenings a week, but he may, if he wishes, extend the time over a longer period of years. A student who is interested in taking a program of courses in preparation for the certificate should consult a member of the business department, who will be his faculty adviser.

Students who have had courses beyond high school should submit their records at an early date for evaluation of credits which can be applied toward a certificate.

The following lists of subjects show which courses are required and which courses may be elected in each of the six certificate groups. Each required course is indicated by a dagger (†). In addition to the required courses the student must elect, with the approval of his faculty adviser, enough courses to bring his total up to twenty-four semester hours. With the approval of a faculty adviser, courses not listed in the groups below may be taken as electives.

Certificate Course in General Business

†Business Principles
Business English or English 1a
English 1b
†Business Correspondence
†Accounting 1
†Accounting 2
Accounting 3
Accounting 4
Business Economics 355a and 355b
Business Law
  †101 Contracts
  102 Negotiable Instruments
  103 Agency and Corporations
  104 Property and Bankruptcy
Business Statistics
Business Psychology
Factory Management
Labor Problems
Personnel Management
†Marketing Practice
Advertising Procedure
Advertising Campaigns
Salesmanship
Public Speaking
Banking
†Business Finance
Investments
Security Analysis (Investments)
Fundamentals of Real Estate Practice
Real Estate Financing

Certificate Course in Accounting

Business Principles
†Accounting 1
†Accounting 2
Business English or English 1a
English 1b
Business Correspondence
†Accounting 3
†Accounting 4
†Auditing 5a
†Auditing 5b
†Cost Accounting 9a
Cost Accounting 9b
C. P. A. Review 135
Income Taxation 402a and 402b
Business Economics 355a and 355b
Business Law
  †101 Contracts
  †102 Negotiable Instruments **or**
  †103 Agency and Corporations
  104 Property and Bankruptcy
Banking
Business Finance
Analysis of Financial Statements
Advanced Accounting Problems 11
Governmental Accounting
Investments
Security Analysis (Investments)

One who intends to enter public accounting work will need to take more than the twenty-four semester hours which are required for this certificate. His faculty adviser will gladly make suggestions for further study.

Certificate Course in Marketing and Advertising

†Business Principles
Business English or English 1a
English 1b
†Business Correspondence
†Marketing Practice
Business Psychology
Business Economics 355a and 355b
†Advertising Procedure
†Advertising Campaigns
Retail Advertising
Accounting 1 and 2
Business Statistics
Banking
Business Finance
Investments
Security Analysis (Investments)
Credits and Collections
Business Law
  †101 Contracts
  102 Negotiable Instruments
  103 Agency and Corporations
  104 Property and Bankruptcy
†Salesmanship
Sales Management
Public Speaking
Retail Store Management
Accounting for Executives
Real Estate Selling

Certificate Course in Finance and Credit

†Business Principles
†Accounting 1
†Accounting 2
Business Economics 355a and 355b
Business English or English 1a
English 1b
Business Correspondence
†Credits and Collections
†Business Finance
†Banking
†Analysis of Financial Statements
Business Law
  101 Contracts
  †102 Negotiable Instruments
  103 Agency and Corporations
  104 Property and Bankruptcy
†Investments
†Security Analysis (Investments)
Real Estate Financing
Life Insurance Fundamentals
Property Insurance

Certificate Course in Industrial Management

†Business Principles
†Accounting 1
†Accounting 2
†Cost Accounting 9a
†Cost Accounting 9b
Business English or English 1a
English 1b
Business Correspondence
Business Economics 355a and 355b
Unemployment Compensation Act
Business Psychology
Labor Problems
†Personnel Management
Business Law
  101 Contracts
  102 Negotiable Instruments
  103 Agency and Corporations
  104 Property and Bankruptcy
†Factory Management
Public Speaking
Business Finance
Time and Motion Study

Certificate Course in Secretarial Work

†Business Principles
†Business English or English 1a
English 1b
†Business Correspondence
†Business Psychology
†Accounting 1
Accounting 2
†Secretarial Training 714
†Secretarial Training 715
Business Economics 355a and 355b
Business Law
101 Contracts
102 Negotiable Instruments
Public Speaking
Marketing Practice
Advertising Procedure
Salesmanship
Banking
Business Finance
††Electives

††Those students who know definitely in what fields they are preparing to do secretarial work should go beyond the subjects listed on this page and choose electives from business courses in the field selected such as Advertising, Accounting, Finance, or Real Estate. This program is also intended to meet the cultural needs of the students who enroll in it. Students may, therefore, choose electives in such fields as English Literature, Modern Language, History, Psychology, and the Social Sciences.

Certificate Courses in Real Estate

The Milwaukee Real Estate Board will issue an official certificate to anyone who is certified by the University Extension Division as having satisfactorily completed four of the Real Estate courses listed below. To students who satisfactorily complete eight of the Real Estate courses listed below will be issued a University Extension Division certificate endorsed by the National Association of Real Estate Boards.

Real Estate Courses

Fundamentals of Real Estate Practice
Real Property Law and Conveyancing
Real Estate Financing
Real Estate Economics
Real Estate Selling
Real Estate Appraisals
Property Management
City Planning and Zoning
Property Insurance

Certificate Courses in Insurance

The University Extension Division is cooperating with the American College of Life Underwriters and the Life Office Management Association Institute in giving courses leading to the designations, certificates, and degrees offered by them.

C. L. U.

The designation Chartered Life Underwriter (C. L. U.) will be awarded to life insurance underwriters who meet the eligibility requirements of age, character, education, and experience, and who satisfactorily pass a series of examinations in the following subjects:

I. Life Insurance Fundamentals
   a. Economics of Life Insurance
   b. Principles and Practices

II. Life Insurance Salesmanship
   a. Principles of Salesmanship
   b. Psychology of Life Insurance Salesmanship

.III General Education (including English)
- a. Economic Problems
- b. Government
- c. Sociology

IV. Laws, Trusts, and Taxes
- a. General Commercial Law
- b. Wills, Trusts, and Estates
- c. Taxation of Insurance

V. Finance
- a. Corporation Finance
- b. Banking and Credit
- c. Investments

L. O. M. A.

Home office employees of life insurance companies will receive a certificate from the Life Office Management Association upon satisfactorily completing the four examinations in Course Number I: Principles of Life Insurance. Those satisfactorily completing Course Number I and the six examinations in Course Number II, Advanced Life Insurance, will become Associates of the Life Office Management Association Institute.

For a description of the courses offered in preparation for the C. L. U. and L. O. M. A. examinations, see pages 53 and 54 of this catalog, or call at the General Office of the University Extension Division for the bulletin which describes the work more fully.

INSURANCE INSTITUTE OF AMERICA

The Extension Division is co-operating with the Milwaukee Board of Fire Underwriters and the Insurance Institute of America in presenting a series of courses that will constitute a well-rounded program of insurance training. During 1936-37 a course in Property Insurance is offered to prepare students to take the Insurance Institute's examination on Part 1 of the Fire Branch.

ENGINEERING

COURSES FOR BUILDERS

Structural Design, the first group of subjects outlined below and offered in evening classes, is intended for men who are working in offices or drafting rooms on structural work, or for men who are interested in structural work. Building Design, the second group outlined, is intended for men who are working or plan to work in architects' offices, and for those who are interested in architectural work. Both courses will be of much benefit either to men who plan to enter contracting work in the employ of some contractor or to men who intend to go into business for themselves. A University Extension Certificate is given for the successful completion of either group of courses.

The demand for competent workers in the fields of design and building is constantly growing, and the responsibilities of men in charge are great. Financial estimates must be accurate; architectural designs must be pleasing in appearance and in ornamental details. Evening study under competent teachers offers the only practical way for the average man to keep pace with modern progress in this field. He will still need the architect and the structural engineer for the large and more important projects, but the training in these courses will fit him to hold more responsible positions, to bid more intelligently and accurately, and to plan architectural details and supervise small projects more competently.

STRUCTURAL DESIGN

First Year

First Semester	Second Semester
Mechanics 206a	Strength of Materials 207

Second Year

Structural Theory 450a	Structural Theory 450b

Third Year

Structural Theory 450c	Structural Theory 450d
Estimating for Builders 497a	Estimating for Builders 497b

Fourth Year

Reinforced Concrete 417a	Reinforced Concrete 417b

BUILDING DESIGN

First Year

First Semester	Second Semester
Mechanics 206a	Strength of Materials 207

Second Year

Architectural Drawing 243a	Architectural Drawing 243b
Structural Theory 450a	Structural Theory 450b

Third Year

Estimating for Builders 497a	Estimating for Builders 497b
Architectural Design 1a	Architectural Design 1b

HEATING, VENTILATION, AND REFRIGERATION

This two-year course is offered for builders, draftsmen, engineers, contractors, estimators, building inspectors, and others who will be benefited by a practical course which will help them to plan, install, estimate, and inspect the various types of mechanical equipment which enter into the construction of our modern buildings. The aim throughout the course is to make the work extremely practical.

The course provides a good foundation training for those with little or no previous experience or instruction in the subjects outlined; it should also prove valuable to those who wish a review of the fundamental principles involved in the various subjects.

A certificate is given by the University Extension Division upon the satisfactory completion of the course.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics, especially arithmetic, is required for entrance.

First Year

First Semester	Second Semester
Elementary Engineering Problems 212a	Freehand Industrial Sketching[1] 203 Sp.
Estimating for Builders 497a	Estimating for Builders 497b

Second Year

Heating and Ventilating 223a	Heating and Ventilating 223b
Refrigeration 222	

MACHINE DESIGN

Students in evening classes may qualify for a certificate in Machine Design by successfully completing the course as outlined below.

The student who intends to become a machine designer should have as basic training some experience in shop practice. This practice he must secure in some shop where he will learn the uses and limitations of machine tools. At the same time he can qualify in elementary drafting by taking the evening class work in mechanical drawing. This will enable him to secure the necessary skill to advance to the position of draftsman. He must then take up the study of mechanical movements and of mechanical principles,

[1] May be taken by correspondence.

as well as the properties and strength of cast iron, steel, brass, and other material. In his last year he will make a study of the strength and proportioning of parts to withstand the stresses to which they will be subjected in the finished machine.

First Year

First Semester	Second Semester
Mechanical Drawing 1	Mechanical Drawing 2

Second Year

Elementary Mechanics 206a	Elementary Mechanics 206b

Third Year

Mechanism 208	Strength of Materials 207

Fourth Year

Machine Design 209a	Machine Design 209b

Women's Rest Room

LIBERAL EDUCATION

The University of Wisconsin Extension Division in Milwaukee has expanded the facilities for adult education by offering, without paralleling the usual college subjects, a series of courses aiming to give the foundation of a liberal education. The courses are on a college or university plane, but no credit towards a degree is involved. The program is in line with the most recent experiments in this type of education in Europe and America.

The underlying principles and aims of the series of Liberal Education courses may be summed up as follows: To give an opportunity for adults to acquire an education which involves more than the obtaining of information and skill—an education which will lead to emancipation from a "drifting with the group" opinion; an education which will engender capacity for self-criticism; and above all, an education which will create a feeling for those things that make life richer and more significant.

With regard to the method of conducting classes, two types of courses are offered: First, lecture courses accompanied by discussions; and, second, courses organized on the basis of co-operative group activities in which the instructor functions as guide and adviser. In certain discussion courses the enrollment is limited.

The requirement for a certificate in Liberal Education is twelve semester courses. Credit towards a certificate will be given to students who have attended the courses with reasonable regularity and have passed the examinations with a satisfactory grade. **Anyone wishing to take the semester examination should notify the instructor well in advance.** If students present credit for work done at other colleges or universities, such credit may be applied in part fulfillment of the requirement for a certificate.

Ability to carry a course and to profit by it is the only requirement for admission.

Courses in Liberal Education may be chosen from the following fields:

Philosophy Group I	Philosophers from Plato to the Present Day Modern Ethics Thinking
Social Science Group II	Social Problems Our Economic Organization Problems in Government International Relations Introductory Psychology Psychology of Human Behavior Child Psychology Abnormal Psychology

History Group III	Ancient Civilizations Medieval Civilizations Contemporary Civilizations European Influences upon American Life and Institutions History of Religions
Language-Literature Group IV	The Story of Language The Bible as Literature Masterpieces of Foreign Literatures in English Translations English, Irish, and American Poetry from the Beginning of the Nineteenth Century Shakespeare and His Contemporaries Modern American and English Novelists and Dramatists
Art Group V	Appreciation of Painting and Sculpture Appreciation of Music Photography
Biological and Physical Sciences Group VI	Zoology Botany Eugenics Astronomy Chemistry Anthropology Geology Geography
Home Interests Group VII	The Relation of Good Nutrition to Health Home Planning and Decorating Home and Community Health Textiles—Attractive and Appropriate Clothing

In addition, any course listed under Letters and Science, Business, or Engineering may be elected for credit toward a certificate in Liberal Education.

Some of the courses planned for the biennium 1936-38 are:

Modern Drama
Contemporary Poetry
Irish Literary Revival
Twentieth Century Classics
The Contemporary Novel
Study of the Short Story
The Home Garden
Home Planning and Decorating
Home Planning and Decorating (Advanced Course)

French in Everyday Life
Contemporary World Affairs
Post-War Dictatorships
World Imperialism
International Problems and Relations
Polish Literature in English Translation
Current Economic Trends
Psychology of Human Behavior
Primitive Man in Central America (Series of Courses on Primitive Man)
Masterpieces of Art and Music Past and Present
Great Art Galleries of the World
Lectures on Modern Astronomy
The Art of Thinking

The courses in Liberal Education are described in the Liberal Education Bulletin issued each semester.

DESCRIPTION OF COURSES

The following descriptions cover courses which may be given during the evening. For time, fee, and instructor, consult schedule, which will be issued each semester.

BUSINESS

M. R. Schnaitter, M.A., Associate Professor of Economics, Chairman
H. R. Doering, B.A., M.B.A., Assistant Professor of Business Administration
Harry L. Kunze, M.A., J.D., C.P.A., Assistant Professor of Accounting; in charge of Accounting Courses

The following full-time members of the Extension Division Staff devote a part of their time to Business Courses.

H. R. English, M.A., Professor of Business Administration
Lester F. Brumm, B.A., M.S., Associate Professor of Business Administration
John J. Creamer, B.A., LL.B., Associate Professor of English
Lyman S. Judson, Ph.D., Assistant Professor of Speech
George A. Kopp, Ph.D., Assistant Professor of Speech (on leave, 1936-37)
Mary R. Babcock, M.A., Instructor in English
James S. Parker, B.A., M.B.A, Instructor in Economics

Part-Time

Ferdinand Aumueller, Instructor in Advertising
James A. Book, B.S., C.P.A., Instructor in Accounting
Russell A. Clark, B.A., LL.B, Instructor in Real Estate Law
Henry C. Fuller, Sr., C.L.U., B.A., Instructor in Life Insurance
Phil P. Hayes, Instructor in Real Estate
C. A. Holmes, Instructor in Salesmanship
Floyd E. Jenkins, B.A. LL.B., Instructor in Business Law
R. F. Linehan, B.A., C.P.A., Instructor in Income Tax
Robert F. Marty, Instructor in Property Management
William M. Metzker, B.A., Instructor in Business Administration
Walter E. Rilling, B.A., Instructor in Accounting
Harrison Saudek, Instructor in Real Estate Appraisals
Olga E. Schlueter, B.A., Instructor in Secretarial Work
Milo F. Snyder, B.S., Instructor in Accounting
Charles J. Timbers, Instructor in Insurance
Raymond G. Weihe, M.A., Instructor in Public Speaking
Leonard E. Zastrow, C.P.A., Instructor in Accounting
Additional instructors to be appointed.

GENERAL

350. Business Principles.

A broad view of modern business organization and management is gained from this course. While particular attention is paid to the basic principles upon which every successful business is built, much useful information is also presented concerning production, marketing, finance, and administration. By giving the student a better insight into the problems of other departments besides his own, the course should increase his usefulness to his company.

Among the subjects discussed are: organizing for ownership control; the corporation; financing a new enterprise; managing the finances of a going concern; how to read the financial page; sources of investment information; business risks; the changing consumer; how manufactured goods are marketed; the independent dealer vs. the large-scale retailer; advertising as a marketing force; scientific management; eliminating waste in business; organizing for production; handling human relations; and teamwork in a business organization.

355a. Business Economics.

Economics, "the scientific study of industry and business," is a preparatory or foundation subject for all advanced courses in general business, accounting, marketing, advertising, finance, public utilities, and industrial management. This course has been organized so that it covers the subjects usually found in the Economics section of the C. P. A. examinations. Questions used in former Wisconsin examinations are thoroughly reviewed during the progress of the course.

The material deals almost entirely with current problems in commerce, industry, and finance as follows: organization of business, corporation control and management, stocks and bonds, advantages and disadvantages of large scale production, mergers, pools, holding companies, trusts, trade associations, labor organization and policies, money and credit, banking and the federal reserve system.

355b. Business Economics.

This is a continuation of the beginning course, Business Economics 355a. The subjects covered are: business cycles, price changes, business forecasting, stock exchanges and speculation, transportation, international trade, foreign exchange, taxation, public utilities, market prices, government control of business, socialism, and communism.

It is desirable to take Business Economics 355a before this course, but it is not required.

139. Business Statistics.

The principal objective of this course is to develop the student's ability to undertake the statistical analysis of a business problem. The topics discussed include: sources of business information; classification and tabulation; charting; and the preparation and interpretation of statistical reports.

The major portion of the time is spent in a study of the various methods of graphical presentation.

196. Business Psychology.

How may the laws of human nature be used in dealing with people in business? In discussing this question the course deals with such topics as the following:

Vocational Guidance: Basic principles in choosing a vocation; the use of psychological tests and occupational analyses; preventing "misfits."

Industrial Psychology: The interview; the value and limitations of psychological tests in selecting employees; job analyses; rating scales as a basis for promotion; psychology in personal relations between executives and employees, and between co-workers; increasing industrial efficiency.

Psychology Applied to Salesmanship and Advertising: Finding the customer's wants; motivation; sales appeal; helping the customer to buy; answering objections; closing the scale; reason why vs. emotional appeals in advertising; psychology in relation to advertising technique.

370. Duties of an Executive Secretary.—*Clubs, Trade Associations, and Other Organizations.*

Secretaries, treasurers, and other officers of business clubs, trade associations, or similar groups should find Course 370 interesting and valuable. In it different phases of organization activities are covered by lectures and discussions; and an attempt is made to ascertain the most effective methods of solving the problems of organizations.

Among the subjects discussed are: membership building; committee work and reports; program building; organization accounting; financial reports; projects, activities, and objectives of various types of organizations; parliamentary law; constitution and by-laws; duties of officers; office management; publicity literature; responsibilities and opportunities of organization executives.

357. Social Security Legislation.

Business executives, social agency officials and workers, office managers, accountants, those in charge of payroll records, and others who have charge of the administration of unemployment insurance and workers' retirement taxes will be interested in this course. Citizens who desire to keep abreast of the latest trends in social security, for their own information, will also be interested.

The federal social security act of 1935 and the Wisconsin laws passed in conformity with it are analyzed and appraised. Primarily attention is devoted to the amended Unemployment Insurance Law of Wisconsin. Full details concerning contribution taxes, reserve funds, benefit rates, payroll and employment records are given. The present plan is discussed both as to the tax burdens it entails and with reference to the benefits to employees.

The federal tax for compulsory retirement annuities, which begins in 1937, is covered.

In less detailed fashion, the course deals with the United States and the Wisconsin legislation for old-age assistance, blind pensions, aids to dependent children (mothers' pensions), other child-welfare grants, and grants for expansion of vocational rehabilitation and public health service.

Emphasis throughout the course is placed on the practical mechanics of administration of these systems of social insurance.

Speech

7. Beginning Public Speaking.

This is a practical course to help business and professional men and women in their speaking, both in public and in private. A maximum of platform work is required of each student. The theory offered is applied, immediately, to actual speaking situations. The course is designed to teach the individual to prepare and deliver speeches creditably.

707. Advanced Public Speaking.

This course is offered to those who desire to become better than average speakers. A study is made of the principles of psychology which underlie successful speech, and these principles are tested out in class speaking. Each student undertakes to refine his voice, to polish up his delivery, and to acquire those fine points of technique which are indicative of a good speaking style. It is given for those who have had an elementary course in speech.

For other courses in Speech, see page 108.

ACCOUNTING

21. Accounting for Executives.

This survey of accounting is provided for executives, investors, and others who are primarily interested in analyzing and interpreting the operating and financial facts of a business. The usual courses in accounting, designed for training those who expect to practice bookkeeping and accounting, contain so much problem work that they are unsuited to the needs of those executives and investors who wish a more general knowledge of the subject.

Throughout the course the function of accounting in depicting the condition of the business occupies the foreground. A thorough foundation is, however, laid in the construction of accounts, in accounting records, and in sources of accounting facts.

No previous knowledge of bookkeeping and accounting is required. Students who plan to prepare to work as bookkeepers and accountants should not take this course; they should start with Accounting 1.

1. Introductory Accounting.

This course is primarily intended for those who have no knowledge of bookkeeping. It may be taken advantageously, however, by anyone who

has had a half year of high school bookkeeping or who has not studied the subject for some time.

Some of the topics treated are: form of the journal; analyzing transactions; debit and credit; form of the ledger; the account; posting to the ledger; trial balance; profit and loss statement; balance sheet; the working sheet; closing the ledger; correcting errors; accounting for unused supplies; accounts with proprietor; classification of accounts; notes receivable and notes payable; interest on notes; purchase journal; sales journal; cash journal; the advantages of special journals; merchandise discounts; opening books; nature of partnerships; partner's drawing and investment accounts; division of profit and loss; drafts; trade acceptances; the note register; discounting notes; insurance; sundry general expense; accounts with fixed assets; depreciation; controlling accounts; accruals; and C. O. D. shipments.

2. Introductory Accounting.

At the beginning of the course accruals and controlling accounts are reviewed. The following topics are then covered: corporate organization; capital stock; opening entries; surplus; dividends; capital and revenue expenditures; recording depreciation; property records; disposal of equipment; bad debts; functional profit and loss accounts; combination journal; perpetual inventory; controlling account for expense; goodwill; vendor's account; use of percentages; classification of accounts; decimal system; current assets and liabilities; departmental accounts; petty cash; statement analysis; book value; comparative statements; conversion of partnership into corporation; common stock; preferred stock; stock books; treasury stock; no-par stock; bonds; discount and premium; sinking funds; manufacturing accounts; voucher system; sundry insurance accounts; and the analysis of accounts.

Prerequisite: Accounting 1 or one year of bookkeeping in high school.

3. Accounting Principles and Practice.

The purpose of this course is to round out and complete the study of accounting fundamentals embraced by the regular first year's course. Practice sets are not used, but the student is introduced to advanced problem material. A study is made of the following subjects: early development of bookkeeping; single entry; classification of accounts; the accounting period; realized and unrealized profits; operating and extraneous profits; deferred and accrued items; working papers; statement of cost of goods manufactured; profit and loss and surplus statements; advantages and disadvantages of corporations; trusts as business companies; entries for stock issues; premium and discount; forfeited subscription; bonus stock; stock issued for property; purchase of business; organization expense; treasury stock; no-par-value stock; dividends; actuarial science; cash; accounts receivable; average date; interest; notes and acceptances receivable; valuation of inventories; retail method; consignments; installment sales; and fixed assets.

Prerequisite: Accounting 2 or its equivalent.

4. Accounting Principles and Practice.

This is a continuation of Course 3. The topics covered are: tangible and intangible fixed assets; valuation; depreciation methods; disposals of fixed assets; repairs; replacements; appraisals; depletion; patents; goodwill; types of securities; classification of investments; stock rights; amortization of bond premium and discount; fixed liabilities; bonds outstanding method; current liabilities; contingent liabilities; tax and bonus problems; funds and reserves; correction of profits and surplus; adjusted statements; correcting the books; comparative statements; ratios; analytical per cents; analysis of working capital; miscellaneous turnovers; book value; accounting for variation in profits; changes in price, volume, and costs; departmental operations; fixed and variable expenses; and statement of application of funds.

Prerequisite: Accounting 3 or its equivalent.

5a. Auditing.

The course in Auditing is designed for those who are interested in acquiring a practical knowledge of the principles of auditing. Anyone who has a thorough knowledge of accounting principles and practice may enroll. Students taking the evening courses in accounting are qualified to take this course after they have completed Accounting 4.

Some of the topics treated are: balance sheet audits; detailed audits; how to begin an audit; division of work between junior and senior; the audit program; working papers; branch auditing; auditing from trial balance and from original records; auditing asset accounts; auditing the liability accounts; the auditor's report; auditor's certificates; practical application of principles by a study of actual cases.

5b. Auditing.

The student is given the complete working papers of a balance sheet audit carried through the working trial balance and is required to prepare exhibits and a report. The following topics are treated: audit of current and capital assets; nature of the examination with particular reference to the preparation of working papers; current and capital liabilities; limitations and possible scope of an audit; opening and closing an audit; preparation of reports; duties and responsibilities of the auditor; the detailed audit; purchases and expenses; trial balances; assets and liability items; office methods; depreciation; scope of investigations; a sale or purchase of a business; requirements; period covered; analysis of earnings and expenses; future requirements and economics; system of accounts; elimination of unusual items; adjustments and qualifications; errors in the books; investigation on behalf of a retiring partner when the business is being sold to a continuing partner; investigation of those in charge of reorganizations; investigation for creditors; examination for bankers; investigations after bankruptcy; investigation for purely credit purposes; investigation in patent litigation.

Prerequisite: Auditing 5a or its equivalent.

9a. Cost Accounting.

Course 9a is intended for those who need to know cost accounting, either as an aid in performing their duties in manufacturing plants or as preparation for public accounting. It is open to students who have a thorough knowledge of accounting principles and practice. Students who have completed Accounting 2 will be admitted, although candidates for the certificate in Accounting must have completed 3 and 4 also.

Some of the topics covered are: what cost is; what cost accounting is; control of cost records by general books; information presented by statements; necessity for monthly statements; control of sales, cost of expense; divisional cost; elements of cost; cost formulas; departments and department costs; actual, normal, and standard costs; principles of process cost accounting; principles of specific order cost accounting; manufacturing expense; selling and administrative expense; necessity for controlling accounts; voucher register; analysis sheet; cost records; stores ledger; finished parts and finished goods ledger; work in process ledger; manufacturing expense ledger; perpetual inventories; accounting for material; material storage and consumption; calculation of materials, accounting for labor costs; accounting for manufacturing expense; distribution of service department costs; distribution of manufacturing expense to production.

9b. Cost Accounting.

This is a continuation of the first semester course in cost accounting. A part of the course consists of practice work on a set of manufacturing accounts. New principles introduced are illustrated as far as possible by the consideration of cases and problems. Some of the topics covered are: preparation of analytical cost statements; comparative statements; handling defective work and spoiled work; accounting for byproducts; containers and packing costs; interest on investment; graphic charts; estimating cost systems; standard costs; uniform cost accounting methods.

Prerequisite: Accounting 9a or its equivalent.

11. Advanced Accounting Problems.

Extensive practice is given in the solving of difficult problems. A great deal of new material is studied which is not covered in the other courses. Partnership accounting is considered at length, including the admission and retirement of a partner, sale of business, incorporation, and liquidation. Other topics covered are: venture accounts; insurance; bankruptcy; accounts and statements of insolvent concerns; statement of affairs; realization and liquidation account; home office and branch accounting; estates and trusts. Considerable attention is given to consolidated working papers, balance sheets, and profit and loss statements.

Prerequisite: At least two years of accounting.

402a. Income Taxation, Federal and State.

A study is made of the federal income tax law as applied to individuals, partnerships, corporations, estates, trusts, and fiduciaries. Careful consideration is given to gross income, exempt income, net income, taxable in-

come, and allowable deductions. Practical problems involving different situations are assigned so that the student will become familiar with the various phases of the law. Some time is given to the Wisconsin State Income Tax Act and especially to those provisions which differ materially from the federal law.

402b. Income Taxation, Federal and State (Advanced).

This course is intended primarily for those who have had some experience along the lines of income taxation. It should be of special interest to accountants, attorneys, business men, and others who come in contact with income tax matters. Ample opportunity is given for classroom discussion of questions and income tax problems. The various classes of taxable entities recognized under the law are studied. Special consideration is given to recent changes in the federal and Wisconsin income tax laws. Since the various problems which are assigned are considered under both the federal and the state law, the student understands the requirements of each with respect to the same problem.

135. C. P. A. Review.

The aim of this course is to provide a review of the material ordinarily covered in state C. P. A. examinations. While some attention is given to questions on economics and business law, a great part of the time is spent on accounting theory and problems. The problems are from Wisconsin and other state examinations and were chosen because they contain significant and important points which can be brought out in the minimum amount of time and without unnecessary repetition. Students are expected to bring solutions to class, where they will be discussed in detail. The accounting principles involved in each problem are thoroughly covered. Emphasis is placed on the method of attacking problems and on the proper presentation of work done.

The course is planned for advanced students and for those who wish to prepare for examinations. It presupposes a knowledge of the fundamentals of accounting in the various fields.

134. Governmental Accounting.

The course in Governmental Accounting is intended for government officials, employees of governmental units, candidates for the C. P. A. Certificate, and others who find it necessary to have a knowledge of the general procedure of keeping the accounts of a government. It is designed to present the latest theory and practice in keeping the accounts of a governmental unit. Students entering this course should have a thorough knowledge of general accounting principles.

The subjects treated include: introduction to government accounts: relation of commercial and governmental accounts, funds; expendable revenue funds: definition, kinds, typical transactions; the budget: kinds of budgets, procedure, records; revenues and cash receipts: distinction between revenues and receipts, classification of revenues and receipts, recording revenues and receipts; appropriations and disbursements: making ap-

propriations, recording appropriations and disbursements, accounts of the Treasury; bond, assessment, and trust funds: types of bonds, accounts and records for various funds; working capital funds; stores; job accounts: the operation and accounting procedure of working capital funds, stores system and job accounts; sinking funds and property accounts: operation of sinking fund, accounting practice in relation to property accounts; consolidated balance sheets and classification of expenditures: type of balance sheets, purpose, character, and object of expenditures; accounting systems for towns and villages: discussion of systems as installed and supervised by the Wisconsin Tax Commission.

12. Unemployment Compensation Act.

A practical knowledge of the legal and accounting phases of the Wisconsin Unemployment Reserves and Compensation Act is gained from this course. The topics treated are as follows: the purpose of the law and conditions under which it became effective; contributions to the funds; waiting periods; benefits; limitations of employers' liability; employees' rights; the keeping of records; the administration of provisions of the law and penalties; and the Federal Unemployment Compensation Act.

Duties of the Executive Secretary, see page 43.

For University credit courses in Accounting, see page 84.

BUSINESS LAW

The following four courses in law are not intended to prepare candidates for the state bar examination but are designed to be of substantial benefit to persons concerned with business affairs.

101. General Elementary Law and Contracts.

This beginning course has for its introduction a treatment of the development of business law together with some legal history and a survey of constitutional law, trial of cases, and the local system of courts. The major portion of the course is devoted to a study of the law of contracts, particularly the formation of contracts, legality of particular agreements, forms and evidences of contracts, and the performance, breach, transfer, and assignment of contracts.

This course and Courses 102 and 103 are recommended for those intending to take the examination for the Certified Public Accountant Certificate.

102. Negotiable Instruments and Sales of Personal Property.

The first half of the course is devoted to the law of the sale of personal property and is a detailed study of the law of contracts as applied to the sales of personal property. Particular emphasis is placed upon the distinction between sales and contracts to sell and upon transfer of title, warranties both express and implied, and the rights of third parties to sue in tort in certain cases. The Uniform Sales Act is the basis of this first part.

The second half is devoted to the study of the law relating to negotiable paper. The difference between assignability of contracts in general and the transfer of negotiable instruments is emphasized. Through this course the student becomes familar with bills of exchange, promissory notes, and checks; also with the responsibility of endorsers and the method of charging endorsers by protest and notice of dishonor. The importance of being a holder in due course is particularly stressed.

103. Agency and Corporations.

The law of agency is studied in the first half of the course. A knowledge of this subject is essential to a proper grasp of the law of corporations, since corporations can act only through agents. The remainder of the time is devoted to the study of the legal advantages and disadvantages of corporations, the charter of a corporation and how to procure it, powers and authority of corporations, duties of officers, rights and disabilities of stockholders and directors, laws of different states, foreign corporations, trusts and monopolies, and dissolution of corporations.

104. Real Property, Probate Law, and Trusts.

The fundamental principles of law presented in this course should be familiar to every person who has property of his own or of others to administer. The first part is devoted to a few historical principles of the law of real property in order to afford a background for the study of wills, estates, and probate law. Each student is expected to draw one or more wills, the important points of which will be studied by the class. The latter part of the course is devoted to a study of trusts, including the validity of trusts as governed by the rule against perpetuities. The course is recommended for C. L. U. students.

FINANCE AND CREDIT

137. Business Finance.

A study is made of the method of financing a going concern by the issue of stocks, bonds, short time notes, and the use of bank loans. From this point, inquiry proceeds into the financial problems of promotion, combination, merger, insolvency, receivership, and dissolution. An attempt is made to outline safeguards against financial losses including insurance and accounting control, and to analyze causes of business failure and methods of reorganization.

401. Credit and Collections.

The men and women in credit and collection work, like those in many other business fields, are feeling the need for more thorough training. This course is sufficiently broad to include the leading phases of the work of companies operating in various business fields. Its particular appeal is to junior executives and all other credit department members who wish to prepare themselves for advancement.

Among the topics covered are: credit work as a profession; the economics of credit; the organization of a credit department; special and general mercantile agencies; other sources of credit information; investigation of credit risks; tactfully refusing credit; analysis of financial statements; instalment credit and collections; collecting by telephone and personal contact; collection psychology; credit and collection letters; the follow-up technique; locating "skips"; insolvent debtors; adjustment bureaus; and legal aspects of credit and collections.

403a. Investments.

The principal objective of this course is to equip the student with certain principles which will aid him in the investing of his own funds or the funds of others. The work begins with an outline of economic fundamentals as applied to the field of investments. Standards are developed by which securities may be measured, and application of these standards is made to the formulation of an investment policy for the individual, for the corporation, and for the institution. Individual securities are examined in the light of these principles, and typical investment accounts are constructed. Since the scope of the course is general, only a minimum amount of time is given to the interpretation of balance sheet and profit and loss statements. A more complete and detailed financial analysis is reserved for the advanced course.

403b. Security Analysis (Investments).

Although the material presented in this course presumes an acquaintance with the previous one, students may enroll who have an equivalent knowledge gained either through study or experience. About half the time is spent on the study of bonds and other fixed-value investments and the remainder on equity commitments, such as preferred and common stocks, together with convertible issues and warrants. Some attempt is made to lay down the principles by which an investor should apportion his funds between these two types.

The analytical part of the course deals in general with the balance sheet, the profit and loss statement, and the statistical position of separate industries. Attention is directed to those items on the balance sheet and profit and loss statements which have proved to have value for investment purposes. The following topics are studied: capitalization structure; reserves for depreciation and depletion; provision for contingencies; hidden assets; calculation and significance of book value; depreciation and other write-offs; the relation of earnings to fixed charges; a comparison of dividends and earnings; and the ratio of the market value of common stock to the par value of outstanding bonds. Other customary practices and ratios are given consideration in so far as they are considered applicable to investment policy.

Studies are made of various industries with respect to the opportunities presented to them for profitable return on funds. The question of hedging

through diversifying investment lists is given attention. Finally, a survey is made of recent legislation concerning security exchanges.

404. Forecasting Security Markets.

Men and women who wish to learn the most up-to-date forecasting technique developed by leading authorities will be interested in this course. It is also sufficiently specialized to appeal to professional people, such as individual market operators, brokerage and bond house men, investment counselors, managers of estates, and trust-department employees.

Among the topics covered are: technical, manipulative, and psychological factors; business "fundamentals" vs. market structure; mechanical forecasters; types of movements; market pressure groups; resistance and turning points; out-of-line movements; perspective, figure, area, percentage, and wave charts; moving averages; breakdown analysis; Dow theory; gaps; triangles, trend lines, range, and breakout; congestion, resting, and terminal areas; head and shoulder structures; time blocks; the count technique; pattern placement; market strategy; protective rules; selecting individual issues; and forecasting practice.

405. Advanced Security-Market Forecasting.

Those who have taken Course 404, Forcasting Security Markets, are eligible to enroll for this advanced work. Others are also eligible upon approval by the instructor.

A critical examination is made of the more advanced methods used by leading authorities. Each member of the group is encouraged to develop his own powers of analysis.

406. Practical Business Statistics and Forecasting.

Statistics is the language of modern business. Figure-facts have replaced guesswork and rule-of-thumb methods. In view of this new trend the Extension Division is offering this course in Practical Business Statistics and Forecasting.

The course emphasizes the application of facts and figures to actual managerial problems. In particular, each member of the group is encouraged to apply the information gained in the course to the business with which he is connected. In addition, the group develops a Milwaukee Business Condition Chart. Each person is given the opportunity to tie in figures for his company with those of the industry to which it belongs, or with trend figures for Milwaukee, the United States, or whatever territory or field may be of interest to him.

All the steps are clarified through simple, practical examples, requiring no knowledge of higher mathematics.

Some of the topics considered are: calculating sales opportunities; using statistics to cut costs; determining sales and profit trends; forecasting business conditions; keeping in touch with local business barometers; learning to calculate with the slide rule; analyzing your own business; locating statistical data; constructing and interpreting charts; measuring your customers' wants; understanding the barometers of statistical services, such

as Babson's, Harvard, Standard Statistics, together with their forecasting record.

These problems are analyzed through the use of such statistical techniques as: sampling; tabulation; charts; averages; index numbers; ratios; seasonal and cyclical fluctuations; forecasting sequences; and moving averages.

Business Statistics, see page 42.

INSURANCE

800. Casualty Insurance and Corporate Suretyship.

This course is intended for casualty and surety agents who desire further technical knowledge of the business. It is presented from the agent's viewpoint and is designed to aid him in his production and to furnish information enabling him to solicit all of the coverages which he has available. A study is made of each of the casualty and surety lines, the computation of rates, underwriting and selection of risks, and practical aids to selling and solicitation.

810. Property Insurance.

Course 810 is recommended to underwriters, salesmen, and office employees of fire insurance companies and agencies. The course is concerned with the development of property insurance as adapted to American conditions. It includes a brief history of the business, an analysis of prevailing contracts with their essential features, together with discussion of such items as voidances, cancellations, modifications of standard policies, loss adjustments, and the use of standard forms in different states. Other items considered are: insurable interest, contract stipulations concerning mortgagors and mortgagees, warranties and representations, indorsements of limits on liability, and exemptions from specific hazards. Analysis is made of various types of risks; common fire hazards and new types of risk due to changing industry are discussed, and a study is made of the various types of fire prevention, first-aid devices, fire alarms, and fire protection. Types of insurance carriers, such as mutual, reciprocal, and stock companies, are given consideration; so are the activities of insurance carriers with reference to rate making, underwriting, inspection, and fire prevention.

801. Principles of Life Insurance.

Upon the successful completion of this course students are prepared to take the examinations given by the Life Office Management Association Institute, as outlined in its Course Number I. Students who successfully complete the four examinations of Course Number I, given each spring by the Institute, will receive the L. O. M. A. Institute Certificate.

Others who may not wish to take the L. O. M. A. examinations may enroll in the course for the purpose of improving their general knowledge of life insurance fundamentals.

Among the topics discussed are: history of life insurance; types of companies; plans and uses of insurance; annuities; mortality tables; prem-

ium rates; reserves; dividends; policy contracts; special forms of insurance; selection of risks; insurance investments; annual statement; organization of life insurance companies; home office organization; governmental supervision and taxation of life insurance; legal phases of life insurance.

802. Advanced Life Insurance.

This course prepares students to take the examinations given by the Life Office Management Association Institute, as outlined in its Course Number II. Those who have taken the previous course, Principles of Life Insurance, are eligible to register for the advanced work. The Institute permits the student to "take examinations in Course Number II before all examinations in Course Number I are completed, provided that any unpassed examinations in Course Number I are written with any examination in Course Number II."

Those who satisfactorily pass the six examinations of this course, as well as the four examinations of Course Number I, will receive the L. O. M. A. Institute Associateship Degree, and the use of the title "Associate of the Life Office Management Association Institute."

Some of the subjects covered are: life insurance and investment accounting; interpretation of annual statement; investments; agency organization; governmental supervision and taxation; legal aspects of life insurance.

803. Life Insurance Salesmanship.

The first part of the semester is devoted to the principles of salesmanship; the last part is devoted to the psychology of life insurance salesmanship, analysis of sales interviews, general principles underlying selling, strategy of selling.

804. Life Insurance Fundamentals.

This course covers: the nature of life insurance and the basic principles underlying it; family and personal uses of life insurance; investment service of life insurance; business uses of life insurance, with special reference to close corporations and partnerships; classification of policies; annuities; settlement options; the science of life insurance; measurement of risk; principles of rate making; the reserve; loading; surrender values; surplus and distribution; industrial, group, and fraternal insurance; disability insurance; types of companies; organization of companies; selection and treatment of risks; legal interpretation of the policy and application; insurable interest; the law pertaining to the beneficiary, the assignments, and the agent; business life insurance trusts; life insurance as an investment. Special attention is also given to professional programming of life insurance and to estate conservation.

NOTE: Life Insurance Fundamentals can be pursued with profit by the layman who is not selling insurance but is interested in it from a business, financial, or protection standpoint. Courses 803 and 804 can be taken by those who cannot qualify for the C. L. U. Designation but who wish to improve their knowledge and ability in the insurance field.

MARKETING AND ADVERTISING

500. Salesmanship.

Everyone in business has something to sell, whether it be goods or services or ideas, and knowing how to sell is a sure way of winning success. Among the subjects covered in this course are: analysis of the article to be sold; the pre-approach; getting attention; overcoming objections; dealing with competition; appealing to buying motives; closing the sale; the personal qualifications of the salesman; development of sales personality.

501. Marketing Practice.

How are manufactured goods moved from the producer to the consumer? What market organization is required? What strategy is used? These are among the questions dealt with in this course.

Special attention is given to such practical problems as: choosing a method of distribution; price policies; price maintenance; methods of competition; selective selling; fashion merchandising; instalment selling; the strong and weak points of the various kinds of retail outlets; corporate chains vs. voluntary chains; the extent to which middlemen may, or may not, be eliminated; and how to find market information.

The course is particularly suited to the needs of those who are employed in sales, advertising, and credit departments.

502. Advertising Procedure.

Intended for the beginner in the advertising profession, this course gives the student a thorough grasp of the fundamentals of advertising procedure and familiarizes him with the various steps in the preparation of advertisements and advertising literature. Time is devoted not only to the planning and writing of copy but also to making the layout and producing the advertisement through the steps of art work, engraving, topography, and printing. The various forms of advertising mediums such as magazines, newspapers, trade papers, radio, direct mail, and outdoor mediums are discussed in detail. The course is helpful to those who are endeavoring to enter the advertising profession as a life's work and also to the busy executive who appreciates the advantages of knowing more about the subject of advertising.

504. Advertising Campaigns.

In Course 504, a continuation of Course 502, the various forms of advertising are correlated into complete campaigns. At least three campaigns are developed: a campaign of national scope on a product appealing to the general public; an industrial campaign intended to sell a product for use in industry; and a retail campaign or one devoted to selling a service rather than a product. Copy is developed, layouts are planned, mediums are selected, and schedules are arranged as nearly as possible as is done in an advertising department or agency. Although many students have completed this course satisfactorily without prior training or experience, the

completion of Course 502 or some experience in the advertising field is to be recommended.

507. Retail Store Management.

The rapid changes which are taking place in the field of retailing make it absolutely necessary that the independent merchant in the relatively small store know more about his business than ever before. He must know what to watch, how to control the merchandising activities in his store, and by what methods he can make sure of operating his store at a profit. This course is organized with those purposes in view. It does not include the complicated methods of large store operation. It shows how small stores can use good merchandising methods without increasing costs. Among the subjects discussed are: layout; display; mark-up; expense control; avoiding wastes; advertising; salesmanship; credits and collections; meeting competition.

Each member of the group has an opportunity to work out the problems which affect his own organization. In this way, as well as through the group discussions, he gets definite, practical help from the course.

BUSINESS ENGLISH AND BUSINESS CORRESPONDENCE

700. Business English.

This course is designed for business people who desire to improve their knowledge of spoken and written English. Salesmen, stenographers, office workers, and those generally who are engaged in business find the course useful in the cultivation of accuracy of expression. It includes the study of the fundamental rules governing correct English usage, sentence structure, paragraph structure, common grammatical errors, the use and abuse of slang, and the form and composition of a good business letter. The course serves as a necessary introduction to the more advanced course in Business Correspondence.

702. Business Correspondence.

Writing effective business letters requires the use of good English and good judgment. This course trains the student to write more clearly, concisely, correctly, and forcefully. It also explains the strategy that is needed in each important type of business letter. What to say is emphasized as much as how to say it.

The course is designed for dictators, secretaries, stenographers, and, in general, for those who wish to progress toward responsible positions in which the ability to write resultful letters is required. It is a logical sequel to the course in Business English.

Actual business letters are analyzed, and practice is given in writing routine letters, adjustment letters, credit and collection letters, sales letters, and letters to salesmen. Attention is paid, also, to giving the letter an attractive, modern appearance.

SECRETARIAL WORK

714. Secretarial Training.

The duties required of a secretary to the business and professional man are outlined. Instruction is given in the performance of such duties, together with practical projects and assignments selected to train the student in the basic principles of business associated with secretarial work. The course is planned to assist stenographers and office workers who desire to advance into secretarial work; to give secretaries additional experience in handling varied executive duties; and to acquaint anyone interested in secretarial work with the fundamentals of secretarial practice.

The subjects treated in this course are: secretarial requirements; secretarial standards in correspondence; composition of simple business letters; vocabulary review; mailing procedure; use of reference books; filing and indexing; meeting callers; telegrams; itineraries; reports and graphs; editing dictated matter.

Shorthand dictation practice is optional.

INDUSTRIAL MANAGEMENT

601. Factory Management.

The factory executive's task has been aptly defined as "delivering the product that is wanted, when it is wanted, at a minimum cost of production." To accomplish this task successfully the factory executive must adopt modern methods of planning, operation, and control.

The following topics are, therefore, covered in this course: the internal organization of a manufacturing concern; locating, equipping, and laying out the plant; providing proper light, heat, and ventilation; system and symbolization; production control, including planning, routing, scheduling, and dispatching work through the factory; quality control (inspection); making time and motion studies; maintenance work; material control; purchasing, receiving, storing, and issuing material; inventory control; salvaging; simplification and standardization in manufacturing; relations between the planning and cost departments.

Cost Accounting 9a and 9b, see page 47.

REAL ESTATE

306. Fundamentals of Real Estate Practice.

Real estate values compose nearly half of our national wealth. They are constantly changing, as they are affected by population growth, industrial development, and environment. This is the first course of the program of real estate education sponsored by the Milwaukee Real Estate Board and the National Association of Real Estate Boards.

The discussion includes the following topics: the real estate market; the value of real estate; apartments and business structures; industrial property; city planning; forecasting city growth; finding property and

prospects; financing real estate transactions; building and loan associations; mortgages; real estate brokerage; managing a real estate office.

308. Real Property Law and Conveyancing.

A knowledge of real property law is of especial value to the real estate owner or operator. The course covers the basic principles of the law of contracts with particular emphasis on contracts relating to real estate. It includes the law of principal and agent in its relation to the real estate broker, the various kinds of estates and titles, and the importance of abstract or title insurance.

The course takes up the method of transferring interests in real estate. The listing contract, option, deed, mortgage, land contract, and lease are treated as well as the manner of executing such instruments. Certain court actions, as "action to quiet title" and the foreclosure of mortgages, are brought out during the progress of the course.

309. Real Estate Financing.

Success in the real estate business is largely dependent upon the skill with which transactions are financed. Automobiles, radios, furniture, and many other things that are sold on easy payments take a large share of the income of the average American family. To an increasing extent these goods are competing directly with real estate. Consequently, in almost every real estate deal credit is a vital factor.

This course is especially useful to real estate brokers and salesmen; to officers and employees of banks, investment houses, mortgage companies, and building and loan associations. It includes practical information on the financing of homes, small stores, industrial sites, office buildings, subdivisions, and apartment houses, including co-operative apartments; the sources of funds for real estate loans; sound appraisal methods; choosing of profitable sites; financial houses furnishing real estate funds, their requirements, organization, and methods of operation; forms of real estate credit; mortgages, land contracts, bond issues, and participation certificates; ground rent systems and long-term leases; and the part played by building and loan associations in financing home ownership.

310. Real Estate Appraisals.

Correct appraisals are not only fundamental but very essential for success in the real estate business. This course emphasizes the economic theory of scientific appraising as well as its practical application to every form of real estate appraisal. The topics discussed are: the relation of zoning and land restriction in the appraisal of real estate; obsolescence and depreciation in residential property; how building costs affect value; the theory of appraising on an income basis. Lectures together with some field work cover the appraisal of the following types of property: vacant residential buildings; a moderately priced home; apartment houses; a combination store, apartment, and office building; vacant industrial property; improved industrial locations; property with misplaced improvements; and lands taken for highway purposes.

Special consideration is given to the appraiser's duty in condemnation proceedings, and in other matters pertaining to courts.

311. Real Estate Selling.

Real estate selling is no longer a haphazard process. It has become a scientific procedure. The salesman must be prepared to sell the service of the realtor and of his own organization. He must be able to analyze the realty he is to sell and the market for it. He must be able to carry out his firm's selling policies and to cooperate with its advertising. Finally, he must understand the actual steps in making a sale. In covering these subjects, this course helps not only the salesman to make sales, but it also aids him in progressing toward sales management and eventually a business of his own.

312. Property Management.

The task of the property manager is to get the greatest possible return from property by putting it to the best possible use. As a merchandiser of space he will first study the possibilities of a location, whether the ground floor space, for example, is most suitable for a restaurant, a drug store, or a men's clothing store. Having determined what the building is most logically suited for, he will develop a renting campaign to secure tenants. He is, also, of course, concerned with securing new tenants when vacancies occur.

The present day building manager is informed about the characteristic features of office buildings, apartment houses, stores, lofts, and other types of income-producing property. He knows how to make suitable arrangements of floor space and how to provide proper light, heat, and ventilation. He knows what type of service his tenants need and expect. He is familiar with the most efficient maintenance methods and with the less complicated, but important, tasks of collecting rents, keeping accounts, and directing a clerical staff.

All of these activities are fully discussed in this course, which has been developed to meet the needs of those who have property management problems, including real estate men, building managers, officers of banks, trust companies, and insurance companies, lawyers who have been charged with the management of estates, and large property managers.

ENGINEERING AND TECHNICAL SUBJECTS

William J. Fuller, B.A., Professor of Civil and Structural Engineering, Chairman
Ben G. Elliott, M.S., M.E., Professor of Mechanical Engineering (Madison and Milwaukee)
Harry T. Avey, M.E., Associate Professor of Mechanical Engineering; in charge of Mechanics and Machine Design
Herbert W. Wesle, B.S., Associate Professor of Topographic Engineering; in charge of Railway and Topographic Engineering Courses
Leo S. Baldwin, B.A., B.S., Assistant Professor of Drawing; in charge of Drawing Courses.
C. L. Dean, B.S., Assistant Professor of Mechanical Engineering (Madison and Milwaukee)
Hiram E. Grant, B.S., Instructor in Mechanical Drawing

Part-Time

E. A. Abendroth, B.S., Instructor in Structural Engineering
George H. Abendroth, B.S., Instructor in Civil Engineering
R. O. Bernauer, B.S., Instructor in Diesel Engines.
Rolland D. Nelson, B.S., Instructor in Mechanical Drawing
Carl Oestreich, B.S., Instructor in Civil Engineering
Walter Richter, B.S., Instructor in Vacuum Tubes
Walter Veenendaal, A.I.A., Instructor in Architectural Drawing
Additional instructors to be appointed.

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule, which will be issued each semester. Courses marked with an asterisk (*) involve credit toward a university degree.

I. Course given first semester.

II. Course given second semester.

ARCHITECTURAL AND BUILDING

1a. Architectural Design.

Design, in so far as it should indicate the character of the building, whether political, religious, or domestic, is taken up in this course. Good design requires grace of form, articulation of parts, proportion and emphasis, these qualities all being dependent upon outline, mass, color, and detail. It comprises the use of both Greek and Roman Periods and the Periods that follow, in conjunction with building design.

The following subjects are taken up: plan and elevation development—monumental, commercial, and residential; interior design in the various periods; application of moldings, decoration, color schemes; furniture designs in rooms of a given period; esquisse-esquisse problems and development; color presentation drawings; criticism on problems with chalk talks.

1b. Architectural Design.

Course 1b is a continuation of the first semester's work. It is open to new students who are properly prepared.

Prerequisite: Course 1a or its equivalent.

243a. Architectural Drawing.

Besides covering the subject of drawing as applied to architectural work, this course gives valuable information on details of building construction and general practice as carried on in an architect's office. It takes up first the principles of drawing, illustrating the most important methods used in architectural work. Some time is spent on architectural lettering, on abbreviations used in architecture, and on schedules of materials, which are so essential for the complete understanding of working drawings.

The student is given practice in drawing various details of a moderate sized house. These drawings include sections through frame walls, brick or stone veneer walls, and tile with brick or stone veneer. Various types of windows, including basement windows, casement windows, inswinging and outswinging windows, and check-rail windows, are detailed. Floor construction for tile or wood finished floors is also included in this course.

243b. Architectural Drawing.

In the second semester the student is required to make drawings of a small house beginning with sketch plans and elevations at ⅛ inch scale. Special attention is given to the proper presentation of these drawings. Working drawings of plans and elevations are then made at ¼ inch scale followed by ½ inch scale drawings of stairway, fireplace, cabinets, and the full-sized details that are required to complete the house.

The course takes the student through the design of a specified residence from the start. Blackboard drawings are made, and lectures are given by the instructor at each class meeting as well as personal criticism of each student's work.

Prerequisite: Course 243a or its equivalent.

497a. Estimating for Builders.

The practical methods of estimating used by builders and contractors are taught in this course. Instruction is given in the reading of blueprints and designs as well as in the fundamentals of arithmetic. Plans for small buildings are furnished, and the student carries through a systematic estimate of all material and labor quantities. He is instructed to use judgment in estimating the quantities of brick, lumber, glass; to make proper allowance for unavoidable waste in construction; to analyze cost data for

similar work and arrive at certain unit costs; to make the proper tabulations, addition, and multiplication in order to arrive at the direct cost.

497b. Estimating for Builders.

This subject is treated from the standpoint of the builder and contractor. The student should have ability to read plans or blueprints and have a fair knowledge of building operations. The course is confined to reasonably large buildings of reinforced concrete, steel, and wood (mill-type construction). A complete set of blueprints, together with the specification of some large buildings in Milwaukee, is acquired by the student. The work of the semester is directed to the preparation of quantity surveys and estimate of the labor required for the different types of construction. This course is a continuation of Course 497a. It is open to new students who are sufficiently prepared. The course in Architectural Drawing is of value if taken during the same semester.

Prerequisite: Course 497a or its equivalent.

Heating, Ventilating, and Air Conditioning, see page 68.

CHEMISTRY

2a. General Chemistry.* I, II. **4 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

This course is designed to offer a broad foundation in the chemical and related sciences. The properties and reactions of non-metals, acids, bases, and salts are studied with special emphasis on the fundamental laws and theories.

2b. General Chemistry.* II. **4 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

A study is made of the inorganic chemistry and qualitative analysis of the common elements. Special emphasis is given to the principles underlying the analytical procedures.

Prerequisite: Chemistry 2a.

14. Quantitative Analysis.* I. **3-5 credits**

Three or four credits, lab. fee and deposit, $17.50; five credits, lab. fee and deposit, $22.50.

Chemistry 14 is a course in the essentials of quantitative analysis. The student analyzes naturally occurring ores and commercial materials.

Prerequisite: General Chemistry, including qualitative analysis.

DRAWING

Architectural Drawing, see page 61.

1. Elements of Mechanical Drawing.* I, II. **3 credits**

Laboratory fee, $1.00.

Topics treated: theory of orthographic projection including auxiliary views; reading problems; isometric drawings; freehand sketching; tech-

nique of making mechanical drawings; vertical lettering. (Only actual machine parts used as problems.)

2. Elements of Mechanical Drawing.* I, II. **3 credits**
Laboratory fee, $1.00.

Topics treated: problems involving the conventional representation of all kinds of threads, springs, fillets, rounds; use of irregular curve; technique of drawing engineering graphs; delineation; thorough study of the form, spacing, selection, location, and decimal limit for dimensioning; sketches of actual machine parts, followed by detail drawings, assembly drawing and tracing; blue printing; design layouts. American Standards Association's conventions and standards used throughout the course. (Only actual machine parts used as problems.)

Prerequisite: Drawing 1 or equivalent in commercial drafting room experience.

(Courses 1 and 2 may be elected for credit by students in the College of Letters and Science.)

3. Descriptive Geometry.* I, II. **3 credits**
Laboratory fee, $.50.

Topics treated: fundamental theory of point, line, and plane, with application to solids; generation of lines and surfaces; tangent planes; sections, intersections, and developments. A large number of the problems used are practical problems in the various fields of engineering, selected so as to correlate the theory with practical applications.

Prerequisite: Drawing 2 or equivalent in commercial drafting room experience.

ELECTRICAL

6a. Vacuum Tubes and Their Industrial Applications. I.

During the first semester the student learns the fundamentals about vacuum tubes. Knowing the fundamentals, he should be able to design simple control circuits containing vacuum tubes. Many problems are worked out by the student throughout the course.

A knowledge of the fundamental laws governing the flow of electric current is required. Students should also have at least a working knowledge of trigonometry.

Some of the topics treated are: short history; thermionic, photo-electric, and secondary emission; practical sources of emission; diode; triode and the fundamental relations of its constants; Helmholtz's and Thevenin's theorem applied to vacuum tube circuits; non-linear conductors and their fictitious replacements; use of plate characteristics for design purposes; single stage vacuum tube relay circuits; time relays; multigrid tubes; multistage and regenerative direct-current amplifiers; a.c. amplifiers; rectifiers for the tube circuits.

6b. Vacuum Tubes and Their Industrial Applications. II.

Among the topics treated are the following: the tube as detector; plate and grid detection; various types of vacuum tube voltmeters; vacuum tube wattmeters; the influence of grid current on d.c. amplifiers; photo-cells and their characteristics; amplifiers for photo-cells; the tube as generator of a.c. of any frequency (oscillator); multi-vibrators; tube circuits operating from a.c. lines directly (photo-relays, capacity relays); gaseous tubes; thyratrons and some of their uses; cathode ray tubes and their applications.

GEOGRAPHY

Geography 7 and 8 are consecutive introductory courses in geography; together they form a unit of work for one year. They are offered to engineering students desiring a general cultural background of world geography without laboratory training.

7. Regional World Geography: Natural Aspects.* I. 2 credits

A survey is made of those natural features of the earth which affect its usefulness to man. Climates, land forms, and natural resources are studied from the standpoint of their distribution and of their relation to man's activities. A brief survey follows of the great geographic regions into which the world is divided. The course is open to freshmen.

8. Regional World Geography: Cultural Aspects.* II. 2 credits

A survey is made of the various regions of the world with special emphasis on their economic development. Those regions most important from a commercial standpoint are treated more fully than districts removed from the channels of the world trade. The course is open to freshmen.

No prerequisite; Geography 7 recommended.

MACHINE DESIGN

1. Machine Design* (Mechanism). I. 4 credits

Among the topics treated are: motion and velocities, instantaneous centers, relative linear velocities, velocity diagrams, cams, gearing, and belting.

Prerequisite: Mechanical Drawing, 1 and 2.

2. Machine Design Practice.* II. 1 credit

This is a short course treating of the practical considerations of machine design. Study is made of the use and application in design of engineering material, formulae, and tabulated data, together with a discussion of factor of safety and allowable stress.

Prerequisite: Machine Design 1.

208. Mechanism. I. (Two evenings a week.)

Mechanism is the study of the motion of the parts of a machine and is sometimes called "the geometry of machinery." Only such mechanisms are studied as are of practical application. Mechanics, strength of materials,

and machine practice are introduced only so far as is necessary to the thorough understanding of the mechanism studied.

The subjects studied include linkages, cams, gears, belts, wrapping connectors, and intermittent motions.

Since much careful drawing is required in the course, a good set of drawing instruments is necessary.

Prerequisite: Drawing and Algebra and Trigonometry or their equivalent.

209a. Machine Design.

The principles of mechanics, mechanism, and strength of materials in the design of machine parts are studied in this course.

Introducing the subject, such topics as materials, loads, stresses, factor of safety, elastic limit, modulus of elasticity, and moment of inertia are studied. Typical elements of machines used as examples in applying principles are: beams; columns; rivets and riveted joints; screws and bolts; keys; lubricating devices; bearings; belt and rope drives; toothed gearing; friction clutches and brakes; shafting; springs; cylinders; and plates.

Prerequisite: Mechanics 206a and 206b or equivalent.

209b. Machine Design.

The work of this course is based upon the instruction given in Course 209a as a prerequisite: Students who have not completed Course 209a but who have had other machine design instruction may enroll for Course 209b with the permission of the instructor.

The subject matter of the course covers the following general topics: design of shafting under various conditions of loading, concentration of stress in fillets, and fatigue of metals due to varying stresses; strength of spur, bevel, and worm gears; friction brakes, friction clutches, friction wheels, belt drives, and rope drives; design of machine frames for strength and rigidity; design of flywheels for inertia, capacity, and strength; stresses in thick cylinders; stresses due to force fits; a brief consideration of the static and inertia forces in connection with rotating and reciprocating machine parts; safety engineering in design.

A selection of suitable problems accompanies the above theory.

212a-b. Elementary Engineering Problems (algebra and trigonometry) See below.

213a-b. Advanced Engineering Problems (analytics and calculus) See page 66.

MATHEMATICS AND ASTRONOMY

212a-b. Elementary Engineering Problems (algebra and trigonometry). The purpose of this course is twofold:

First, to provide practice in analyzing simple problems of an engineering nature.

Second, to provide the foundation of elementary mathematics required for the solution of such problems.

The mathematics used is elementary algebra, geometry, and trigonometry. The problems for analysis and solution are of the type frequently met in surveying, in machinery operation, in heating and ventilating, in refrigeration, and in the design of simple structures and machines. The importance of the habitual use of clear-cut sketches as the basis of analysis is emphasized. Orderly and accurate written solutions are required. Constant use of the slide rule is an essential of the course.

The course is suitable as a review in elementary mathematics and as a preparation for almost all of the subjects of the certificate courses offered by the Engineering Department.

Prerequisite: Working knowledge of elementary algebra.

213a-b. Advanced Engineering Problems (analytics and calculus).

This course is planned to meet the needs of draftsmen and designers who desire a reading and working knowledge of mathematics beyond their present foundation of algebra and trigonometry. Almost all familiar handbook formulas in daily use are based on comparatively simple physical laws. In developing these principles and putting them into working form, methods of analysis and reasoning common to higher mathematics are made use of.

It is the purpose of this course to combine the processes of mathematics and the materials of familiar engineering problems in a series of practical procedures from physical principles to handbook formulas.

Prerequisites: Elementary Engineering Problems 212, Mechanics 206, Strength of Materials 207 or their equivalent.

50. Subfreshman Algebra. I. **No credit.**

The topics covered include square root, quadratic surds, solutions of quadratic equations, simultaneous equations involving quadratics, logarithms, progressions, and the binomial theorem. The course is required of all students who do not pass the examination given to all freshman engineers.

51. Elementary Mathematical Analysis.* I, II. **5 credits**

This course is required of all freshmen in engineering. Applicants for admission are required to pass an examination in algebra, given shortly after the opening of the semester.

The course includes: functions; rectangular coordinates and the straight line; the power functions; the circle and the circular functions; ellipse; hyperbola; single and simultaneous equations; permutations and combinations; binomial theorem; progressions. A thorough review is given at the close. The course gives prominence to the fundamental truths of elementary analysis. Graphing is emphasized.

52. Elementary Mathematical Analysis.* I, II. **5 credits.**

Course 52, Elementary Mathematical Analysis, is regularly required of all freshmen in Engineering and is a continuation of Mathematics 51. The

course covers: logarithmic and exponential functions with applications; trigonometric equations and the solution of triangles; simple harmonic motion and waves; complex numbers; locus problems; and a brief course in conic sections.

Prerequisite: Mathematics 51.

54. Differential and Integral Calculus.* I, II. **4 credits.**

All Engineering sophomores are required to take this course.

Content of course: review of functions and processes taken up in Mathematics 51 and 52; the derivative, its meaning and application; limits; the power function; differentiation of algebraic functions; second derivative applications; infinitesimals; definite integrals; circular functions; inverse circular functions; exponential and logarithmic functions; maxima and minima; polars; integration.

Prerequisite: Mathematics 51 and 52 or their equivalent.

55. Integral Calculus.* I, II. **4 credits.**

This course is required of all sophomore engineers and is a continuation of Mathematics 54.

Content of course: advanced integration; successive integration; center of gravity; moment of inertia; curvature; series; total derivatives; exact differentials and a brief introduction to differential equations.

Prerequisite: Mathematics 51, 52, 54 or their equivalent.

Note: Mathematics 54 and 55 may be taken by Letters and Science students instead of Mathematics 5.

110. Higher Mathematics for Engineers.*

Course 110 is designed primarily for engineers, but it may be taken profitably by any one who wishes an introduction to the fields of applied mathematics beyond calculus. The course is given in three parts, a, b, and c, each covering one semester's work. Any one of these parts may be taken independently of the others.

Prerequisite: Calculus.

110a. **2 credits.**

Elliptic integrals, solution of equations, determinants and matrices, infinite series.

110b. **2 credits.**

Partial differentiation, Fourier series, line integral, ordinary differential equations.

110c. **2 credits.**

Partial differential equations, vector analysis, probability.

111. Review of Calculus. **No credit.**

Engineers and other persons engaged in technical work often find that they have forgotten many of the elements of the calculus which they learned in college. This course is designed for such persons. It provides

a review of the fundamentals of differentiation and integration, and includes the application of these processes to engineering and practical problems. It may be taken with the consent of the instructor by students who have not had a course in the calculus.

112. Differential Equations.* II. **3 credits.**

This course provides a thorough introduction to the study of the solution of the ordinary and partial differential equations. Special attention is paid to the applications of differential equations occurring in engineering, physics, and geometry.

Prerequisite: Calculus.

117. Vector Analysis.* II. **3 credits.**

for description, see page 103.

Astronomy

6. Navigation.* II. **2 credits.**

This course is designed for students who wish an elementary course in practical astronomy or who wish to become familiar with the methods by which the position of a ship at sea is determined. Some of the subjects taken up are: instruments used in navigation; latitude by Polaris; latitude by a meridian altitude of the sun; azimuth; longitude by a time sight of the sun or a star; the method of Marc St. Hilaire; the line of position; and modern methods in practical navigation.

Prerequisite: Trigonometry.

MECHANICAL AND INDUSTRIAL

223. Heating, Ventilating, and Air Conditioning.

This course is offered, primarily, for architects, architectural draftsmen, engineers, contractors, estimators, and others who feel the need of a practical course which will help them to plan, estimate, and install heating and ventilating systems in the various types of buildings. It is, however, of value to anyone interested in heating and ventilating problems.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics and the ability to use simple formulas are required. Much time and work are saved if the student is able to use the slide rule.

The work of the complete course extends through both semesters as indicated below.

First Semester

Topics treated: heat, temperature, specific heat, expansion of solids, liquids, and gases; heat loss from buildings; radiation, conduction, convection, infiltration, exposure factors, coefficients of heat transmission; heat loss calculations, comparison of rules and methods for figuring heat losses; different methods of heating, advantages and disadvantages of

the different methods; warm air furnace heating, fan furnace systems, furnace ratings, pipeless furnace, calculations and design, factors affecting installation and operation, recirculation system, combined heating and ventilation systems as applied to residences and other types of buildings; properties of steam, pressure, evaporation, steam tables, heat of the liquid, latent heat, total heat of steam, specific volume and density; radiators, coefficient of heat transmission, painting, material, location, methods of calculation, indirect and direct-indirect radiators; boilers, classification, types, ratings, selection, safety and economy; steam heating systems, steam vapor, air line and vacuum; pipe fittings, valves and accessories, commercial pipe, fittings, valves and insulation; flow of steam in pipes and pipe sizing, sizing of piping for the different types of steam heating systems.

Second Semester

Topics treated: hot water heating, heat loss and radiation, temperature of water, hot water boilers, gravity, pressure and forced circulation systems; hot water piping, general details of piping, the area method of pipe sizing, pipe sizing for closed tank systems, Honeywell, D. and T., Thrush and Mueller systems, size of valves, mains and risers, basement radiators, branch connections, separate returns; problems in steam heat design, heat losses, radiation, pipe and valve sizes and plan; problems in hot water heat design, heat losses, radiation, pipe and valve sizes and plan; central station or district heating systems, general information on these types of systems; temperature and humidity, general information and methods of control, types of apparatus, and applications; air and its properties and ventilation, study of the conditions of the air and application to ventilating systems; fan systems, as used for heating and ventilating, fans, heating and tempering coils, Vento heaters, humidity and temperature control, air washers, cold and warm air ducts, unit heating systems; problems in design of fan systems, heat loss, direct radiation, vento radiation, size of fan, ducts; plans and specifications; piping, pipe sizes, fittings, valves, air valves, insulation, testing of system; fuels and combustion, coal, oil, gas, and their use in heating systems.

222. Refrigeration.

This is an elementary course and is planned for a thorough study of the fundamental principles of refrigeration. For the student who has had no instruction or experience in refrigeration it provides a good foundation for advanced study. The course should also prove interesting to those who feel the need of a review of the fundamental principles of refrigeration.

The work is based on a standard text. Mimeographed material used in the course is supplied by the Extension Division.

The work of the course contains many calculations and, therefore, a good knowledge of elementary mathematics and the ability to use simple formulas are required. If the student can use the slide rule, he can save much time in making the many calculations involved.

A general statement of the topics treated follows: mechanical and electrical units; heat; change of state; heat involved in the process of refrigeration and unit of refrigeration; principles of mechanical refrigeration; properties of refrigerants; complete compression machine, details of compression machine, and operation of compression machine; direct and indirect refrigeration; absorption system of refrigeration and properties of aqua ammonia; the complete absorption system and its operation; ice-making; economics of refrigeration; insulation; cold storage construction; air circulation and piping of cold storage rooms; cold storage of dairy and other products; automatic or household refrigeration machines.

231. Fuels and Combustion.

The course in Fuels and Combustion offers instruction on the fundamental principles and practices of burning coals and other fuels effectively and efficiently in the furnaces of factory and industrial power plants, as well as in domestic plants.

The work is of special interest and value to firemen, engineers, superintendents and managers of factory and industrial power plants, to fuel dealers and salesmen (industrial and domestic), to boiler and furnace salesmen (industrial and domestic), to students of power generation and development, and to all those interested in the utilization of fuels.

The course consists of regular class meetings conducted on the lecture and round-table plan with ample time for the discussion of all questions. The regular work is supplemented by the use of slides and films, the distribution of suitable literature, and a class question box.

Subjects treated in course: fundamentals of the combustion process; fuels, their properties, values, and characteristics; furnaces (industrial and power plant) and settings; domestic plants; firing and firing methods; mechanical stokers; powdered fuel; use of oil and gas; furnace efficiency; heat conservation and prevention of waste; furnace and boiler room instruments and records; modern development in boiler and furnace practice; fuels for domestic heating; domestic heating with oil and gas; electric heating; economies of fuel utilization.

An advanced course covering a detailed study of a selected group of the above subjects will be organized if a sufficient number of students are interested.

250. Time and Motion Study.

This course is designed primarily for those who are interested in learning and applying the basic laws of motion economy. Among the items covered are: motion study equipment; fundamentals of motion study; principles of motion economy; the working area; motion study by analysis and observation; the process chart; standardization; the relation of motion study to plant layout and equipment.

The technique of time study is presented as a tool to be used in connection with motion analysis in determining and recording the most economical method of procedure for a given set of conditions. Stress is laid upon actual cases; problems are presented for class solution and discussion.

220. Diesel Engines.

Course 220 is offered especially for those who desire to obtain instruction on the fundamental principles of the modern Diesel engine, as well as an understanding of some of its constructional features and operating problems. Although the course is a beginning one on the subject Diesel engines, prospective students should have a good working knowledge of algebra in order to do the work in a satisfactory manner. Generally, a preparation equivalent to high school graduation is required for entrance to the course. Experience in the internal combustion engine field will be given special consideration towards meeting the requirements for entrance. All students should consult the instructor at the first meeting regarding eligibility for the course. In some cases, an entrance examination will be given.

A reference text is used in connection with the course. All students must obtain a copy in order to handle the written work required. The cost of the text is approximately $3.60.

Although all types of Diesel engines will be given consideration, special attention will be devoted to the high speed automotive type. The following subjects will be treated: modern applications and economic status of modern Diesel engines for all types of service; fundamental principles of internal combustion engines; the Otto and the Diesel cycles; types of Diesel engines; air-injection engines; mechanical injection systems; constructional features of Diesel engines, frames, bedplates, cylinders, cylinder heads and liners, pistons, piston rings, connecting rods, crankshafts, valves, bearings, etc.; Diesel fuels; injection systems; combustion in the Diesel engine; injection valves and fuel pumps; lubrication; cooling systems; air intake systems; exhaust systems; engine trouble and remedies; operation and care; Diesel engine applications.

MECHANICS AND MATERIALS

1. Statics.* I. First half semester. **3 credits.**

Prerequisite: Physics 51.

2. Dynamics.* II. Second half semester. **2 credits.**

Prerequisite: Mechanics 1, enrollment in or completion of Mathematics 55.

206a. Elementary Mechanics. (Statics). (Two evenings a week.)

Through the course in statics the student acquires a knowledge of the fundamental facts and theories as well as the ability to apply this knowledge to practical problems. The course is of value to the shopman, draftsman, and designer. It must be completed before any of the design courses are taken up. The application of forces to cranes, derricks, and trusses is covered both graphically and analytically.

Among the topics treated are: concurrent forces; equilibrium; resultant and components; non-coplanar forces; types of trusses; loadings; and friction.

Prerequisites: Algebra and trigonometry.

206b. Elementary Mechanics. (Dynamics and Properties of Materials). (Two evenings a week.)

This is a continuation of Course 206a given in the first semester. The subjects studied in this course are: motion and forces that produce changes in motion; moment of inertia; radius of gyration; work; power; energy; friction; general laws of machines; elasticity and its relation to the strength of beams, columns, and shafts. Consideration of all these subjects as they arise in different aspects in design is given in the solution of many practical problems.

Prerequisite: Course 206a or equivalent.

207. Strength of Materials. II. (Two evenings a week.)

Course 207 is intended for those who aspire to be machine designers or structural or architectural draftsmen. The student should have a good working knowledge of arithmetic, elementary algebra, and the rudiments of trigonometry. He should be familiar with the use of the slide rule and have one of the standard steel handbooks for reference.

Topics treated: properties of materials; simple stresses; elastic properties; cylinders, pipes, and riveted joints; center of gravity and moment of inertia; beams, reactions; shear; bending moments; columns; general reference tables.

Prerequisite: Elementary Mechanics 206a.

PHYSICS AND RADIO

51. General Physics.* I. **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

Mechanics, heat, magnetism, and static electricity are taken up in this course. The course is required of civil, mechanical, and chemical engineers.

Prerequisite: Students must have completed or be taking Mathematics 52.

52. General Physics.* II. **5 credits.**

Two hours lecture-recitation; two hours quiz; four years laboratory. Lab. fee, $7.

Current electricity, sound, and light are treated in this course. The course is required of civil, mechanical, and chemical engineers.

Prerequisite: Physics 51 and Mathematics 54 or concurrent registration in Mathematics 54.

119. Radiation, Ultraviolet to Infrared.*

For description, see page 104.

Radio

7a. Principles of Radio Communication.

This course, which deals with the simplest fundamentals of electricity and magnetism, serves as an excellent review for former students of elec-

tricity, and provides a foundation for those beginning the study of radio. The subjects given special attention in this course are: electrons; Ohm's law; series and parallel circuits; power and energy; measurement of resistance; theory of motors and generators; batteries; inductance; transformers; coupled circuits; capacitance and its measurement.

7b. Principles of Radio Communication.

Course 7b deals with alternating current theory and its relation to the properties of coils and condensers as utilized in radio. Students who have a knowledge of fundamental electrical theory and a good working knowledge of mathematics may obtain permission to begin their radio studies with this course. The following subjects are covered: instantaneous, average, and effective values; phase relation between current and voltage; vector diagrams; capacitive and inductive reactance; impedance; series and parallel circuits; power factor; resonance; properties of coils and condensers in radio use; antenna resistance and its measurement; radio frequency chokes.

7c. Principles of Radio Communication.

Vacuum tubes and their applications are studied in this course. A good knowledge of D.C. and A.C. theory on the part of the student is required. The theoretical consideration of the following topics is thorough but without reference to actual commercial circuits or applications: properties of filaments and cathodes; electron emission; 2, 3, 4, 5, 6 element tube; class A, B, C amplifiers; dynamic characteristics of tubes; undistorted output; power supplies for vacuum tubes; oscillators; detectors; magnatrons, thyratrons, and a consideration of elementary types of receivers—regenerative, tubed radio frequency neutralized, superregenerative, hetrodyne, superhetrodyne, and reflex.

7d. Principles of Radio Communication.

This course is a consideration of circuits of the following commercial equipment and applications: transmitters (code, radiophone, broadcast, and airplane); broadcast and commercial receivers and special circuit variations in various manufactured equipment. Opportunity will be given at each meeting to discuss problems and topics pertaining to Federal Radio Communication Examinations.

8. Laboratory Practice in Radio Communication.

It is recommended that radio students enroll in this course concurrently with both 7a and 7c.

This laboratory course covers training in the measurement of resistance, capacitance, and inductance; fundamental characteristics of vacuum tubes; fundamental circuits in which vacuum tubes can be used; the use of servicing equipment. An opportunity is given to use laboratory equipment for such determinations and experiments as the student may desire. Special attention is given to the use of electronic applications for other than communication purposes.

The course comprises approximately seventy experiments. They are planned to accompany the subject matter in the same order as in the lectures of Course 7. Students are permitted to omit elementary experiments according to their knowledge and ability. Each student performs all experiments individually and, to insure his full understanding of the subject, is required to hand in a written report, which will be critically analyzed with him. Completion of or enrollment in lecture course is a requirement.

9. International Morse Code.

This course is an introduction to code reception and transmission. Practice is planned to enable the student to operate at a speed of 22 words per minute. Students should have some facilities (high frequency receiver or buzzer set) for daily home practice.

11. Current Developments in Radio.

Course 11 is intended for two types of people: (a) those actively engaged in the radio industry as service men and (b) those students who have a broad technical training. The course is a combination of lecture work and practical problems pertaining directly to the subject matter discussed. In addition to the subjects listed below, every effort will be made to cover new developments as they are released during the year. The course covers the following: a brief review of vacuum tube theory; the study of new circuits—automatic volume control; visual tuning; theory of photoelectric cells; cathode ray tubes; iconoscope; difficulties of transmission of pictures by radio; sodium vapor lighting.

For information about full-time day classes in Radio, see page 118.

Vacuum Tubes and Their Industrial Application, see page 63.

RAILWAY ENGINEERING

1. Railway Curves.* I. **2 credits.**

The computation and field location of simple, compound, and spiral curves, and of railway turnouts are covered in this course.

Prerequisite: Trigonometry and Elementary Surveying.

2. Route Surveying.* I. **3 credits.**

The following topics are treated in this course: principles underlying the location of railways, highways, canals, and pipe lines; alignment, including locating of grade contour; gradient, including vertical curves; estimates, including earthwork computations and mass curve.

Prerequisite: Course 1 or concurrent registration.

SPEECH

8a. Extempore Speaking.* I. **2 credits.**

Speech 8a is an elementary course specifically outlined for freshman engineers. It is required of electrical engineers. The course offers a maximum amount of practice in effective organization and presentation of speech material. During the first half of the semester emphasis is placed

upon gaining freedom of expression and achieving power to think before an audience. A detailed study is made of the speaker, audience, material, and the importance of speaking for a definite purpose. Five talks, each with a different general end, are required. The last half of the semester is devoted to applying the principles of effective speaking to special speech projects such as the chalk talk, the oral report, and the oral analysis of scientific articles in the student's professional field and to training in parliamentary practice.

8b. Extempore Speaking.* II. **2 credits.**

Speech 8b is a continuation of Speech 8a. It is planned for freshman engineers.

The purpose of the course is to give the student increased proficiency in the organization and expression of thought. Throughout the semester emphasis is placed on the training of the voice and body for speech purposes. The speech projects consist of a detailed study and presentation of speeches of explanation, action, introduction, presentation, acceptance, welcome, farewell, and response.

Prerequisite: Course 8a.

STRUCTURAL

417a. Reinforced Concrete.

The fundamentals in the design of slabs, beams, and columns are covered in this course. Some of the topics treated are: aggregates; proportioning; design of concrete mixtures; quantities of materials; strength; steel and concrete in combination; flexure formulas; working stresses; diagonal tension; bond stress; designs of simple beams with tension reinforcement; design of slabs, T-beams, and beams with steel top and bottom; design of columns reinforced with bars only and of columns with both bars and spiral reinforcing.

Prerequisites: Courses 206a and 207 or their equivalent.

417b. Reinforced Concrete.

Course 417b, a continuation of Course 417a, applies the theory to the design of various structures. The topics treated are: general types of concrete floors; floor loads; economic considerations; small openings; roofs; columns; bearing walls; retaining walls; window openings; basement walls; stairs; and foundations. Numerous designs are worked out and drawings made.

Prerequisite: Course 417a or equivalent.

450a. Structural Theory.

This course is intended for those who have learned the principles of designing in a preliminary structural course such as 207, or have had equivalent training. The student is taught the design and assembly of a complete structure. The course should be of interest to those who wish to

obtain their architect's or engineer's license, or to those who wish to become draftsmen or to improve their ability as draftsmen.

A complete set of plans showing a two-story steel frame factory building is furnished the student. All of the necessary members are shown, but no sizes are noted. The student is called upon to design the roof structure, monosail runways, machinery supports, floor system, columns, lintels supporting the wall, crane runways, and footings. As the design progresses, details are made of the various members in accordance with standard shop practice. At the completion of the course, the student is provided with a complete set of notes as a permanent record of this work.

The texts required for the course are the *Handbook of the American Institute of Steel Construction* and *the Wisconsin State Building Code.*

Prerequisite: Strength of Materials 207.

450b. Structural Theory.

Course 450b is a continuation of Course 450a. In this course interest is centered on the various types of truss framed roofs instead of on beam framing. Two complete structures are designed: the first, a garage with a book tile or gypsum roof and brick walls; the second, a sheet-metal warehouse.

The student again receives drawings showing these buildings, and is taught how to design and detail the various members. At the completion of the course, a complete set of notes is provided for the student to supplement his class notes.

The texts for the course are the same as those for Course 450a.

Prerequisite: Structural Theory 450a.

450c. Structural Theory.

Instead of working out a complete building design as he did in the previous courses, the student will consider a number of special problems. These problems include: the design of girders for different loadings; the design of truss and girder splices; eccentric connections; special end-connections for beams and grillage foundations. Shop drawings are made in each case. The textbooks are the same as those required for Course 450a.

450d. Structural Theory.

This course, like Course 450c, consists of a number of special problems. These problems include: coal hoppers, water tanks; hip and valley details; wind brackets and bents; towers and columns under eccentric loads. The student is required to make complete designs of the different structures as well as the necessary shop drawings. Textbooks are the same as those required for Course 450a.

SURVEYING, SEE TOPOGRAPHIC ENGINEERING
TOPOGRAPHIC ENGINEERING

(See Also Railway Engineering, page 74.)

1. Elementary Surveying.* I. **2 credits.**

Lab. fee, $4.50.

The theory and practice of pacing, taping, and leveling are studied in this course.

2. Elementary Surveying.* II. **2 credits.**

Lab. fee, $4.50.

Classroom work and field practice in the use and adjustment of the engineer's levels, surveyor's compass, and transit are dealt with in this course.

Prerequisite: Course 1.

3. Land Surveying.* I. **3 credits.**

Lab. fee, $3.

Content of course: theory and field practice in the use of transit, sextant, and plane table, in problems relating to land surveying; the effect of lack of adjustments; instrumental inaccuracies and their elimination; methods used in original land surveys, city surveys, and resurveys. The field work is followed by office practice in computations arising from common surveying problems, in plotting field notes, and in making maps.

Prerequisite: Course 2 and Trigonometry.

104. Advanced Surveying.* II. **3 credits.**

Lab. fee, $4.50.

The following topics are taken up: mining, topographic, and hydrographic surveying, stream gaging, and field astronomy; field practice in solar and stellar observations, topographic surveying, and mapping. (Completion of this course admits the student to the University of Wisconsin Summer Survey Camp.)

Prerequisite: Course 3.

108. Short Course in Surveying.* II. **3 credits.**

Lab. fee, $4.50.

This course is planned to meet the needs of students in mechanical and electrical engineering for a general study of surveying. It may also be taken by students in mining engineering and some other courses. It includes topographic, hydrographic, and land surveying, with field practice in the use of tape, level, and transit.

Prerequisite: Trigonometry.

410. Surveying. II.

Lab. fee, $2.25. (For students in the two-year day course in Building Design and Construction.)

The first half of the semester is devoted to classroom work and the second half to outside problems. The student learns the use of the tape, level, and transit. After completing this course, he should be able to run ordinary levels, give grade for construction, stake out building foundations, and estimate quantity of earthwork.

LETTERS AND SCIENCE

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule, which will be issued each semester. Courses marked with an asterisk (*) involve credit toward a university degree. "Sophomore standing" means 25 credits and 25 grade points.

I. Course given first semester.

II. Course given second semester.

BOTANY

Ruth I. Walker, Ph.D., Assistant Professor of Botany, Chairman
Merlin L. Hayes, Ph.D., Instructor in Botany and Zoology

The laboratory science requirement may be removed by taking Botany 1 and Botany 2, or Botany 1 and Animal Biology 1, or Animal Biology 1 and Zoology 104. If Botany 1 and Animal Biology 1 are chosen to satisfy the science requirement, either one may precede the other, at the student's discretion.

1. General Botany.* I, II. **5 credits.**

Two hours lecture; two hours quiz; four hours laboratory. Lab. fee, $5.00.

The course in General Botany is preliminary to all advanced work. The general make-up of plants is studied with special emphasis on structure, function, development, and heredity. A survey follows of the plant kingdom illustrated by selected types.

2. Advanced General Botany.* II. **5 credits.**

Two hours lecture; two hours quiz; four hours laboratory. Lab. fee, $5.00.

The lectures deal primarily with the history of the development of the scientific spirit in biology and involve a discussion of modern problems of evolution, inheritance, and variation. The laboratory work of the course is a comprehensive survey of the plant kingdom and includes the use of keys in the identification of many plants. In the late spring, laboratory work is done in the field.

Prerequisite: Botany 1.

CHEMISTRY

George G. Town, Ph.D., Professor of Chemistry, Chairman
Paul E. Millington, Ph.D., Assistant Professor of Chemistry
John W. Alexander, B.S., Instructor in Chemistry
Melvin A. Goesh, B.S., Instructor in Chemistry
Victor A. Reinders, Ph.D., Instructor in Chemistry
EuGene Wilda, B.S., Instructor in Chemistry

1a. General Chemistry.* I, II. **5 credits.**

Two hours lecture; two hours recitation; four hours laboratory. Lab. fee and deposit, $12.50.

The course in general inorganic chemistry begins with the study of non-metals and of the fundamental principles of chemistry.

The topics covered are: common elements; oxygen; water; hydrochloric acid; chlorine; chemical theories and laws; chemical equations and calculations; ozone; hydrogen peroxide; the halogens; acids; bases; salts; the atmosphere; ammonia and other nitrogen compounds; nitric acid; sulphur and sulphuric acid; carbon and carbon compounds; hydrocarbons and their derivatives.

In the laboratory, the important non-metals are studied. Attention is given to bleaching agents; common acids of commercial value; ammonia and other common bases; neutralization; purification of water; fuel gases and important by-products of coal gas.

1b. General Chemistry and Qualitative Analysis.* II. **5 credits.**

Two hours lecture; two hours recitation; four hours laboratory. Lab. fee and deposit, $12.50.

A study is made of the inorganic chemistry and qualitative analysis of

Biology Laboratory

the common elements. Special emphasis is given to the principles underlying the analytical procedures.

Prerequisite: Chemistry 1a.

3. Qualitative Analysis.* II. **1 credit.**

Two hours laboratory. Lab. fee and deposit, $2.50.

This course is intended to supply more extended training in qualitative analysis than is included in Chemistry 1b or 2b. It is required of all students in the Chemistry Course who are working for a B.S. degree. It is recommended for all students whose courses require additional training in chemistry.

Prerequisite: Concurrent registration in Chemistry 1b or 2b.

11. Quantitative Analysis.* Yr. **3-5 credits.**

Three or four credits, lab. fee and deposit, $17.50; five credits, lab. fee and deposit, $22.50.

Chemistry 11 is a course in the essentials of quantitative analysis. The student analyzes naturally occurring ores and commercial materials.

Prerequisite: General Chemistry, including qualitative analysis.

17. Elementary Chemistry.* **4 credits.**

Three hours lecture; two hours laboratory. Lab. fee and deposit, $6.00.

The general purpose of this course is to familiarize the student with the philosophy of chemistry and its relation to the complex civilization in which we are living. Rather than give the student a transient command of a restricted amount of factual material, this course endeavors to organize and explain the relationships between the phenomena that are concerned with the changes in matter, as these phenomena affect our daily lives. Special emphasis is placed on the modern scientific method of acquiring knowledge about the material universe. The course is intended for those students who are interested in chemistry for its cultural value, and it can not be used as a substitute for Chemistry 1a and 2a. It is not open to those students who have had any previous training in chemistry. If no credit is desired, the laboratory work may be omitted.

20a. Organic Chemistry.* I. **2 credits.**

Two hours lecture; one hour quiz.

The course covers the chemistry of paraffin and unsaturated hydrocarbons, alkyl halides, polyhalogen compounds, alcohols, organic acids and their anhydrides, acyl chlorides, esters, ethers, aldehydes, ketones, organic compounds of sulfur, amines, amides, nitro-paraffins, cyanogen and its related compounds, together with an introduction to stereoisomerism and tautomerism.

Chemistry 20a and 21a should be taken concurrently.

Prerequisite: Chemistry 1b or 2b, or equivalent.

20b. Organic Chemistry.* II. **2 credits.**

Two hours lecture; one hour quiz.

Chemistry 20b is a continuation of Chemistry 20a, covering aromatic hydrocarbons, their derivatives, amino acids, proteins, sugars, starch, cellulose, cellulose derivatives, heterocyclic compounds, synthetic drugs, and alkaloids. Throughout both courses considerable emphasis is placed upon physiological applications of organic compounds. Chemistry 20a and 20b together are identical in scope with Chemistry 120.

Chemistry 20b and 21b should be taken concurrently.

Prerequisite: Chemistry 20a or its equivalent.

21a. Organic Chemistry.* I. **2 credits.**

Six hours laboratory; lab. fee and deposit, $17.50.

This course includes the preparation and purification of a number of representative and important aliphatic compounds, including ethyl bromide, ether, acetic anhydride, ethyl acetate, soaps, fatty acids, acetone, acetaldehyde, methyl amine, and acetonitride. The principles and technique involved in the various processes are stressed.

Prerequisite: Chemistry 20a or its equivalent, or concurrent registration in Chemistry 20a.

21b. Organic Chemistry.* II. **2 credits.**

Six hours laboratory; lab. fee and deposit, $17.50.

Chemistry 21b continues with the more difficult preparation of the benzene derivatives and includes dyes, dye intermediates, aromatic alcohols, aldehydes, and ketones. Considerable attention is devoted to the properties of and tests for proteins, sugars, and starches. The two courses, Chemistry 21a and 21b, are equivalent to Chemistry 121.

Prerequisite: Chemistry 20b and 21a, or their equivalents, or concurrent registration in Chemistry 20b.

117. Inorganic Preparations.* **2-5 credits.**

Two credits, lab. fee and deposit, $12.50; $4.50 per additional credit.

This course covers the fundamental principles of chemical manipulation and advanced general chemistry. The experimental work done gives the student:

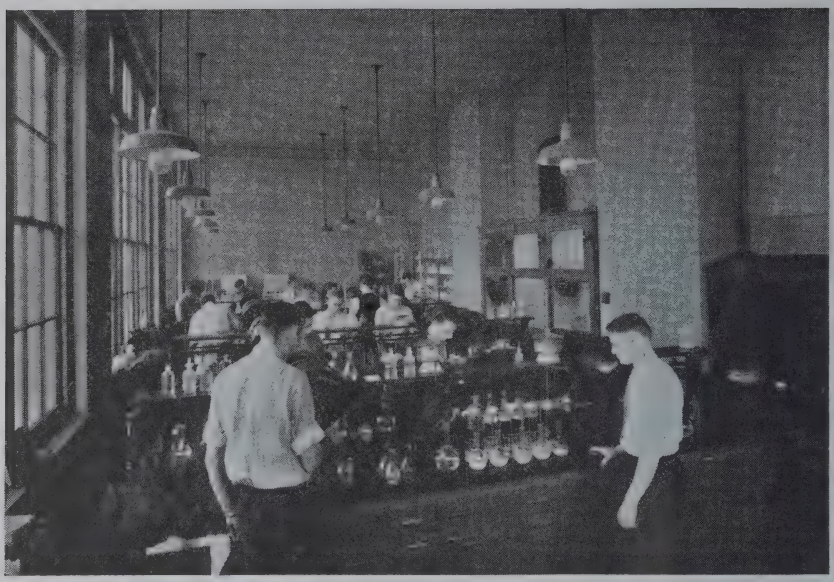
First A grasp of the fundamental principles on which chemistry is based;

Second An understanding of the various types of reactions employed in inorganic chemistry;

Third A knowledge of the chemistry of the important types of inorganic compounds;

Fourth Greater familiarity with laboratory technique and apparatus. The discussions and reports familiarize the student with the literature of inorganic and physical chemistry and assist him in expressing his findings clearly and concisely.

Prerequisite: 1a and 1b or 2a and 2b.



Chemistry Laboratory

155. Advanced Quantitative Analysis.* **2 credits.**

Course 155 is based on the application of physico-chemical methods to analytical chemistry. The topics covered include: heterogeneous equilibrium; precipitation as a rapid crystallization; co-precipitation; the phase rule and ignitions; the modern concept of acids and bases; neutralization and hydrolysis; buffers; oxidation and reduction; complex ions; the solubility product principle; and the analytical chemistry of common and rare elements.

Prerequisite: Chemistry 11.

DRAWING

Leo S. Baldwin, B.A., B.S., Assistant Professor of Drawing; in charge of Drawing Courses.

Hiram E. Grant, B.S., Instructor in Mechanical Drawing.

1. Elements of Mechanical Drawing.* I, II. **3 credits.**

Laboratory fee, $1.00.

Topics treated: theory of orthographic projection including auxiliary views; reading problems; isometric drawing; freehand sketching; technique of making mechanical drawings; vertical lettering. (Only actual machine parts used as problems.)

2. Elements of Mechanical Drawing.* I, II. **3 credits.**

Laboratory fee, $1.00.

Topics treated: problems involving the conventional representation of all kinds of threads, springs, fillets, rounds; use of irregular curve; tech-

nique of drawing engineering graphs; delineation; thorough study of the form, spacing, selection, location, and decimal limit for dimensioning; sketches of actual machine parts, followed by detail drawings, assembly drawing and tracings; blue printing; design layouts. American Standards Association's conventions and standards used throughout the course. (Only actual machine parts used as problems.)

Prerequisite: Drawing 1 or equivalent in commercial drafting room experience.

ECONOMICS

M. R. Schnaitter, M.A., Associate Professor of Economics, Chairman
Lester F. Brumm, B.A., M.S., Associate Professor of Business Administration (Madison and Milwaukee)
E. E. Schwarztrauber, M.A., Instructor in Economics (part time)

1a. General Economics.* I. **4 credits.**

This course is designed to acquaint the student with the basic characteristics of our modern economic organization and the mechanism which operates our business world. A brief introduction compares our present business system with earlier systems, showing how our business, financial, and industrial organizations have developed. A study is made of the organization, management, and financing of corporations and other types of business concerns. Stocks, bonds, capitalization, large scale enterprise, and industrial combinations are examined. A section of the course is devoted to labor organization and policies, industrial conflict, and the methods of settling industrial disputes. Money, credit, and banking are considered at length with particular emphasis upon the federal reserve system and recent changes in the financial world. Other topics covered include speculation, insurance, international trade, foreign exchange, and the problems of transportation. The course closes with a study of value and prices.

Prerequisite: Full sophomore standing (25 credits and 25 grade points).

1b. General Economics.* II. **4 credits.**

Following the more elementary discussion of principles and problems in Economics 1a, this course takes up more advanced subjects. The first part deals with the factors which determine wages, rent, interest, and profits in the business world. Following this comes a study of the causes and effects of business cycles and price changes. The personal distribution of wealth and income is also examined in detail. Attention is given to consumption and the factors affecting consumption and saving. Consideration is given to the problems in the field of public finance, such as taxation, public expenditures, public loans and debts, and to economic policies, such as laissez faire, governmental control, protective tariffs, free trade, and the control of industrial combinations. The work for the year concludes with a survey of plans for economic reconstruction.

Prerequisite: Economics 1a.

8. Elements of Accounting.* I. **3 credits.**

Lab. fee, $1.50.

Course 8 takes up in detail the principles of double-entry bookkeeping. It includes the use of the fundamental books; the treatment of sole proprietorship, partnership, and corporation accounts.

Prerequisite: Sophomore standing.

In the College of Letters and Science this course may be counted as part of the credits required for graduation only by students in the School of Commerce.

9. Intermediate Accounting.* II. **4 credits.**

Lab. fee, $2.50.

In this course the theories of general financial accounting are first considered. These theories are followed by problems which illustrate their application. Particular attention is given to the preparation and analysis of profit and loss statements and balance sheets.

Prerequisites: Economics 8 and Mathematics 7.

ENGLISH AND JOURNALISM

John J. Creamer, B.A., LL.B., Associate Professor of English, Acting Chairman
Elisabeth K. Holmes, M.A., Assistant Professor of English
Frank M. Hursley, M.A., Assistant Professor of English
Mary R. Babcock, M.A., Instructor in English
Dudley C. Brooks, M.A., Instructor in English
R. Felix Morrison, M.A., Instructor in English
Gracia E. Torinus (Mrs. R. Blake), M.A., Instructor in English
Herbert T. Webster, Ph.D., Instructor in English
Virginia M. Johnson, M.A., Instructor in Journalism (part-time)

1a. Freshman English.* I, II. **3 credits.**

This course in Freshman English is required of all freshmen in all the colleges of the university. Its purpose is to give careful training in standard English speech and writing and to develop accuracy in thinking and skill in expression. To this end the class routine consists of the preparation of themes and exercises and the study and class analysis of representative English prose. Reports on the collateral reading from selected lists of novels, essays, plays, and poetry are required at intervals.

A course in Remedial English is given for the benefit of those students whose knowledge of English is not up to standard. No credit is given for this course and attendance may be made compulsory at the discretion of the individual instructors.

1b. Freshman English.* I, II. **3 credits.**

English 1b is a continuation of English 1a. In the second semester the principles of exposition are studied particularly in relation to the writing of reports of various kinds. Students are taught the methods of research, of the preparation of manuscripts, of gathering bibliography, of annotating.

Students who are taking technical subjects are instructed in the methods of making technical reports in their special fields. The course continues the preparation of reports on collateral reading and the analysis of prose specimens.

Prerequisite: English 1a.

2a. Sophomore Composition.* I. **2 credits.**

This course deals with beginning work in narrative writing of several kinds, and with such descriptive writing as heightens narrative effect. It is a basic course in imaginative composition and may be taken for its own sake or as a preparation for either the study of literature or the practice of highly specialized writing, as drama, verse, or fiction.

Prerequisite: English 1b or a grade of "A" in English 1a.

2b. Sophomore Composition.* II. **2 credits.**

This is purely a course in exposition. Different forms of exposition, such as the persuasive, the analytical, the critical, the informal, and the informational, are studied and practiced. The course is designed to train in clear, compact, energetic thinking. It offers a particularly valuable preparation for persons looking forward to professional writing.

Prerequisite: English 1b or a grade of "A" in English 1a.

30a. Survey of English Literature.* I **3 credits.**

This course (together with 30b) follows the historical plan of study. The selections assigned for reading and study are linked with lectures on

Drawing Laboratory

the social and literary background from the beginning until modern times. It is designed for students primarily interested in English literature and is recommended for English majors and minors. It fulfills the literature requirement for sophomores who are candidates for the B.A. degree. The semester's work covers the period from Chaucer to Dryden.

Either Courses 30a and 30b or Courses 33a and 33b must be taken as prerequisite for all advanced courses in English literature. A student who has a semester's credit in Course 33 may not elect either semester of Course 30.

Prerequisite: English 1b or a grade of "A" in English 1a.

30b. Survey of English Literature.* II. 3 credits.

This is the second semester of a year's course in the historical survey of English literature. It follows the same plan as 30a; reading assignments for each meeting are discussed in class, and the necessary historical and social background is provided by lectures. The semester's work extends from Swift and Defoe up to nearly the present time.

33a. Introduction to English Literature.* I. 2 credits.

This course is intended for those who wish to increase their appreciation and enjoyment of literature. It is a study of representative masterpieces and personalities in English literature from the sixteenth century to our own time. Since the emphasis is on the appreciation rather than on the history of literature, the various authors are not taken up in chronological order. Lectures in the course present information concerning the literary backgrounds of selections studied, as an aid to critical understanding. The reading is in English poetry.

English 33a is parallel to English 30a (General Survey) as a prerequisite to advanced courses in English literature. A student who has a semester's credit in Course 30 may not elect either semester of Course 33.

Prerequisite: English 1b or a grade of "A" in English 1a.

33b. Introduction to English Literature.* II. 2 credits.

Course 33b continues the study of English literature begun in the first semester. The drama, the biography, the essay, and the novel are considered in their various typical forms. Although English 33b is a continuation of 33a, it constitutes a distinct unit in itself and may be taken as such by non-credit students.

English 33b is parallel to English 30b as a prerequisite to advanced courses in English literature.

39. The English Novel.* Yr. 2 credits each semester.

This is a year course in the study of the English novel. Wide reading in representative English novelists from Defoe to Hardy and Conrad constitutes the bulk of the student's work. The lectures in the course treat of the antecedents of the modern novel, the evolution of types, the influence of literary and intellectual movements upon the novel, and the lives of the more important novelists. The first semester traces the history of the

novel to the end of the Eighteenth Century; the second semester to the beginning of the Twentieth Century.

Prerequisite: English 30 or 33.

40. American Literature.* Yr. 2 credits each semester.

The aim of this course is to acquaint the student with representative and intrinsically important literature produced in the United States from colonial times down to the present. In the lectures an attempt is made to interpret the literature in its general social and intellectual setting and to trace the changes in literary interest and taste. In addition to tracing the main currents in American thought and culture, the lectures include biographical studies of the more important authors, stressing the facts of their lives which affected their work.

This course should be preceded or accompanied by English 30 or 33.

Journalism

1a and 1b. General Survey of Journalism.* 1 credit each semester.

Practical talks once a week on the character and scope of journalism work, including a consideration of newspapers, magazines, technical and trade journals, agricultural publications, and advertising, are given. This course is required of freshmen who intend to enter the School of Journalism; it does not count for credit toward graduation from the general courses in Letters and Science.

11. Magazine Writing. No credit.

The purpose of this course is to give the student basic training in the preparation and sale of non-fiction material for magazines and newspapers. The course is definitely realistic in its methods, since the actual sale of the material produced by the members of the class is looked forward to. Types of magazine articles, the organization of feature stories, the technique of interviewing, the use of photographic material, and the fashion in news articles are among the topics treated in class. Reading, criticism, and suggested revision of papers prepared by members of the class are a regular part of the program.

17. Problems of Magazine Writing. No credit.

The purpose of this course is to develop the special abilities of the individuals in the class to meet the needs of particular markets. The course is open to those who have taken the course in Magazine Writing 11 and to others who have the ability to produce marketable non-fiction material. The student is assisted in the analysis of the requirements of the market at which he is aiming and in the sale of his production. Because of the individual nature of the work in this class the enrollment is limited to twenty-five.

14. Technique of the Short Story. No credit.

A selection is made from the innumerable processes of the craft of fiction. Some of these selected processes are repeated each time the course is offered; for example: self-study to discern one's aptitudes, survey of basic

types, study of the stages in development of a story from idea to completed manuscript, the collection of material, and the study of chief means to create the illusion of reality. From other aspects of fiction writing a selection is made so that two-thirds of the lectures vary from one semester to another. The class period is devoted to a lecture, answers to questions bearing on it, and discussion on any practical matters which may be brought up as to the craft of fiction. Hence, the class work is general. The writing assignments, however, are strictly individual, in kind, amount, and frequency so that each student may proceed along the line and at the speed congenial to him. No text is required.

15. Marketing the Short Story. **No credit.**

Emphasis is upon writing for the practical end of submitting work for publication. This necessitates a careful, critical analysis of specific magazines, but the choice of them is made by the student, and the assignments in analysis are individual, as are also those dealing with the fiction written. Though the class meetings are devoted to talks by the instructor and discussions based on them, these are less formal and prearranged than in the course in technique, since they are based on the shifting conditions of the market. No other texts are required than the copies of the publications analyzed. It is chiefly a writing course.

19. Commercial Journalism. **No credit.**

The object of the course is to start prospective writers on the road to sales.

The subjects include newspaper features, newspaper serials and short stories, trade journal articles, advertising copy and ideas, magazine articles and short features, film scenarios, contests, and radio scripts and ideas.

Each member receives individual criticism and advice.

For other courses in English, see page 56.

FRENCH, see page 95.

GEOGRAPHY

Ira Edwards, Ph.D., Lecturer in Geography (part-time)
J. R. Whitaker, Ph.D., Assistant Professor of Geography (Madison and Milwaukee)

Geography 5 and 6 are consecutive introductory courses in geography; together they form a unit of work for one year. They are intended primarily for students expecting to enter the School of Commerce, and for those desiring a general cultural background of world geography without laboratory training.

5. Regional World Geography: Natural Aspects.* I. **3 credits.**

A survey is made of those natural features of the earth which affect its usefulness to man. Climates, land forms, and natural resources are studied from the standpoint of their distribution and of their relation to

man's activities. A brief survey follows of the great geographic regions into which the world is divided. The course is open to freshmen.

6. Regional World Geography: Cultural Aspects.* II. 3 credits.

A survey is made of the various regions of the world with special emphasis on their economic development. Those regions most important from a commercial standpoint are treated more fully than districts removed from the channels of world trade. The course is open to freshmen.

No prerequisite; Geography 5 recommended.

128. Conservation of Natural Resources.* I. 2 credits.

This course deals with the natural resources of the United States—waters, minerals, lands, forests, and wild life—in terms of their character and distribution and with the problems relating to their preservation, utilization, and renewal. Emphasis is placed on current conservation problems of major importance to the people of Wisconsin and to the nation as a whole.

Prerequisite: Sophomore standing or consent of instructor.

GERMAN, see page 98.

HISTORY AND POLITICAL SCIENCE

Hilmar C. Krueger, Ph.D., Assistant Professor of History, Chairman
John M. Gaus, Ph.D., Professor of Political Science (Madison and Milwaukee)
George T. Hunt, Ph.D., Instructor in History
Lee E. Lawrence, M.A., Instructor in History and Political Science
Egbert S. Wengert, Ph.D., Instructor in Political Science (Madison and Milwaukee)

The introductory courses 1, 2, 5, and 10 are open to freshmen and may be taken by sophomores. They are all year courses. Students selecting one of them as a freshman requirement must take it for **three credits a semester throughout the year**, or a total of six credits. If they take another as an elective, concurrently with or after the completion of the three-credit course, they must take it for only **two** credits a semester, omitting whatever supplementary work is assigned to the three-credit students. Students not registered in the College of Letters and Science may take any of these introductory courses for two or three credits a semester, for one or two semesters. Students who take History 3 cannot elect History 1 or 2; they may take History 5 or 10, each for 2 credits a semester.

1a. Medieval History.* (to 1100) I. 2 or 3 credits.

In this course an attempt is made to show the relationship of the three elements of medieval history: the Graeco-Roman civilization, the Christian church, and the Germanic peoples. The course begins with one element, Rome, already declining; with another, the church, just arising as a political power; and with the Germans, the third element, threatening the Roman frontier. The growth of the church as a cultural and political power forms

one development, the advance of the Germans in government and cultural appreciation forms another.

1b. Medieval History.* (1100-1500) II. 2 or 3 credits.

The course begins about 1100 and follows closely the work of the medieval people in the crusades, in commerce and industry, and in the town movement. The intellectual life is seen in the founding of the universities and in the studies pursued in them. Medieval literature, Latin and vernacular, is read, and some architecture is viewed. In the political sphere, the nationalism of France and England, the particularism of Germany, and the resultant conflicts with ecclesiastical and baronial powers find their place. The last four weeks of the course are spent on the Renaissance: political and economic changes, painting and sculpture, literature and architecture.

Prerequisite: History 1a or consent of instructor.

2a. Modern European History.* (1492-1815) I, II. 2 or 3 credits.

The course is a study and an analysis of the chief movements in European History between 1492 and 1815. It begins with the commercial and religious revolutions of the fifteenth and sixteenth centuries and closes with the agricultural, industrial, and political changes of the eighteenth century. A study is made of the governmental and cultural developments of the great states, at times in topical order, at times in biographical sketches. The overseas expansion of the European countries is traced to various parts of the globe—America, Asia, Africa. Special attention is given to the ideas and reforms of the enlightened despots of the eighteenth century, and to the writings and teachings of those who criticized the Old Regime which these despots hoped to continue. The course closes with the victory of the critics, with the French Revolution, and the spread of the revolutionary ideas in the Age of Napoleon.

2b. Modern European History.* (1815 to the present) I, II. 2 or 3 credits.

In general the course is an analysis of the factors and circumstances bringing about the Great War and of post-war problems. The first part of the course takes up the victorious campaign of conservatism against the new forces and ideas of the French Revolution and Napoleon. This part ends in 1848. Several weeks are spent in following the triumph of liberalism and nationalism during the second half of the nineteenth century; the formation of the Third French Republic and the rise of the German Empire are traced. Some time is spent on Italy; attention is given to the nationalistic movements in Austria, Russia, and the Balkans. The course then takes up the European penetration into Asia and the partition of Africa; and to the vicious European rivalries is added the international competition for colonies and commerce. The relationship of this competition to the formation of European alliances and the gradual division of Europe into two opposing camps are explained. An attempt is made to correlate the nationalistic movements, the commercial and colonial rivalries, and the growing tension between the two opposing forces, all of them leading to the world

conflict. An explanation is offered of post-war problems and developments; these are compared and contrasted with those succeeding the Napoleonic Era.

Prerequisite: History 2a or consent of instructor.

3a. European Civilization from the Fourth Century to 1648.* I. 5 credits.

Since the course is intended to be an integrated survey of European civilization, only those political affairs are studied that suggest the general development of the modern national state. The development of papal and ecclesiastical power, culminating in the struggle between church and state, and the breakdown of the universality of the medieval church through the Protestant Revolt are taken up along parallel lines. In the economic sphere the change from agriculture to industry and commerce, and from rural to urban life is analyzed in detail with subsequent study of the instruments of business, communal organizations, the rise of capitalism, and the general growth in materialism and secularism. The development of the medieval mind is traced in the various stages, through the early Middle Ages, the Carolingian Renaissance, the Renaissance of the Twelfth Century, and the Italian Renaissance. In the cultural field, literature and learning, philosophy and science, architecture and the fine arts find an important place. (Probably will be given in 1937-38).

3b. European Civilization Since 1648.* II. 5 credits.

The course begins with a study of centralized and absolute forms of government on the continent and the struggle for parliamentary government in England. In the political sphere the course traces the overthrow of the absolutism by republicanism as seen in the French Revolution and the many revolutions of the nineteenth and twentieth centuries. General trends like nationalism, democracy, and internationalism are developed with contemporary problems in mind. The expansionist and imperialistic movements outside of Europe, the attempt to force European ideas upon other countries, and the ensuing conflict between western and eastern civilizations form a great part of the course. An attempt is made to follow the general trends in literature, science, philosophy, and ethics, and the general liberal movement from the nineteenth century onward. Considerable time is spent on the rise of labor, on social conditions, and on the legislation aimed to improve economic and social conditions. (Probably will be given in 1937-38.)

5a. English History.* I. 2 or 3 credits.

Course 5a begins primarily with the Anglo-Saxon invasion and traces the growth of English institutions to the death of Queen Elizabeth. Stress is given to the contributions of the various peoples migrating to England, and comparisons are made with existing institutions in Europe. The course deals with the life of the people, their religion, government, and social and economic progress. The central theme is to develop an understanding of those factors which aided in the transition of England into a modern state.

5b. English History.* II. 2 or 3 credits.

This course traces the development of English institutions from the accession of James I to the present. Emphasis is placed upon the rise of responsible government and democracy, the industrial revolution, and commercial expansion of the English people. In this connection, political and economic reforms are studied as an indication of the progress of modern England. The formation of the British Empire and growth of imperialism receive attention, especially in view of British participation in world politics.

Prerequisite: History 5a or consent of instructor.

10a. Ancient History.* (Orient and Greece) I. 2 or 3 credits.

The first weeks of this course are devoted to the great Oriental centers, Mesopotamia, Egypt, and Persia, and to minor states like Assyria, Chaldea, and Palestine. The greater part of the semester is devoted to the history of the Greeks. The social and legal aspects of Greek life are studied in the development of the Athenian democracy as well as in the camp of the Spartan soldier; and the cultural development and its culmination in the Periclean Age, as seen in the philosophy and religion, literature and art, receive detailed attention. The course ends with the Post-Periclean Age.

10b. Ancient History.* (Hellenistic Age and Rome). II. 2 or 3 credits.

During the first weeks a study is made of Alexander's conquests and the results of these conquests. In the realm of politics and industry as well as in literature, philosophy, and science comparisons and contrasts are drawn between the Hellenistic and the Periclean ages. The background is given for Rome's task in the path of civilization.

The last twelve weeks are spent on Rome. This part includes Republican Rome, its expansion over the Mediterranean, its great social and economic problems under the Gracchi, and its ultimate failure. The process of reconstruction in the Empire of Augustus receives considerable attention, since it covers almost all phases of Roman life and letters. The Roman legions are followed to the various parts of the known world, where they build roads and erect temples, aqueducts, and baths, symbols of Roman victory and advance. Some time is spent on the new element, Christianity, as it grows up. The course ends with the "Decline and Fall of the Roman Empire."

Prerequisite: History 10a or consent of instructor.

4a. History of the United States.* I. 3 credits.

This course traces the development of American nationality from 1763 to 1840. Emphasis is placed on the origin and formation of the national government and those factors which influenced its growth. The gradual evolution of democratic institutions, the emergence of an American spirit, and the social and economic life of the new nation receive consideration.

Prerequisite: Sophomore standing.

4b. History of the United States.* II. **3 credits.**

The emergence of the United States into a world power is the central theme of this course, which extends from 1840 to the present day. Emphasis is placed upon the slavery controversy, growth of industry and "Big Business," the rise of organized labor, party politics, and American imperialism. The aim of the course is to develop an understanding of present day America with its complexity of social, economic, and political problems.

Prerequisite: Sophomore standing.

Political Science

7. American Government and Politics (National).* I. **3 credits.**

This course offers an inspection and critical analysis of the chief problems of American national politics. Attention is paid both to functional activities and to the larger issues raised by the efforts of the federal government to deal with the economic crisis. Emphasis is placed upon the social forces which condition or determine governmental forms and actions. It is not open to freshmen.

125. Survey of World Politics.* II. **3 credits.**

Course 125 is an analytical introduction to the foundation of international relations. A survey is made of the factors controlling relations among nations: nationalism; imperialism; and racial, populational, and economic problems. A study is made of the settlement of international disputes by war and by methods other than war. Emphasis is placed upon recent and contemporary foreign policies. There is no text; assignments are made in standard general works, official publications, pamphlets, and periodicals.

Prerequisite: Full sophomore standing (25 credits and 25 grade points).

143. Introduction to Public Administration.* **2 or 3 credits.**

During the past century the modern state has received an extension of functions, with a consequent increase in the importance of public administration and a widening in the discretionary power of the administrative agencies. This has been true on all levels of government from the local to the international. This course is designed to provide a means through lecture-discussions, reports of its members, and in other ways, whereby the major problems resulting from these trends and developments may be studied. Among the problems considered are: the functions of government and their change in extent and nature; the share of the administrator in the formulating of policies; the devolution of administration by area and to interest-group organizations as under the National Recovery Act, and to public corporations such as the Tennessee Valley Authority or the British Broadcasting Corporation; the redistribution of functions among levels of government such as to metropolitan areas and other regional units; the auxiliary services relating to personnel, budgets, public relations and gen-

eral staff services, and political, judicial, and executive controls over administration.

Prerequisite: Political Science 7 or consent of instructor.

LANGUAGE REQUIREMENTS

Candidates for the B.A. degree may meet the requirement in foreign language in one of the following ways:

1. By passing examinations in what is known as the intermediate or reading examination in two languages.
2. By passing what is known as the proficiency examination in one language.
3. By securing 32 credits in one, two, or three languages. These credits may be earned partly in high school and partly in the University, or wholly in the University. High-school work is accepted in satisfaction of the foreign-language requirement at the rate of four university credits for one unit, up to the amount of six units, or 24 university credits. A student is not permitted to repeat in college, for credit, the equivalent of a course in foreign language which he has had in high school. Eight credits is the least amount of a single foreign language which will be accepted toward the foreign-language requirement of any course, and if two or three languages are presented, at least 16 credits must be in one language. Students choosing a foreign-language major must present a second foreign language.
4. By passing one intermediate test and by presenting 16 credits additionally.

The student who meets the requirement by examination is still required to earn 120 credits for graduation, but no specified number of credits must be earned in foreign language. A student may at the time of entrance, or whenever he feels properly prepared, take either the reading examination in two languages or the proficiency examination in one language. If he passes, he will be exempt from any further language study, so that the credits which he might have been obliged to earn in language may be earned in other subjects. Languages may, of course, be continued as electives.

The reading examination should be within the ability of the average student who has had two years of the languages concerned in college or two years in high school plus one year in college.

The proficiency examination may be attempted by good students who have had the equivalent of three years of college instruction including a course in conversation.

Content of Examinations

The reading examination will test the student's ability to comprehend prose in the foreign language of about the difficulty of texts now used in

the fourth semester. He will also be required to translate a passage from the foreign language into good English and to show familiarity with idioms and vocabulary. In addition the student must demonstrate his ability to pronounce the language by reading a passage out loud in the presence of the examiner.

The proficiency examination in addition to testing the ability to comprehend the printed page will test the student's knowledge of literature and history as related to the language involved. There will also be an oral examination to test the student's ability to understand and answer simple questions in the foreign language.

Arrangements for Examinations

These examinations will be held soon after the opening of the first semester, between semesters, and near the end of the second semester. The exact time and place will be announced by the Recorder.

Students planning to take these examinations should consult Dr. Purin for German, Miss Steinfort for Spanish, and Dr. Young for French. Formal application for permission to take the examinations should be made to the Recorder at times to be announced.

Students who fail may take the examinations again, whenever offered.

Ph.B. Degree

The language option for the Ph.B. degree may be met either by examination or by credits earned in college.

B.S. Degree in Education

Those students who expect to enter the School of Education at the end of the sophomore year should be prepared to pass attainment examinations for their language requirement.

LANGUAGES

French and Spanish

Charles E. Young, Ph.D., Professor of Romance Languages, Chairman
Meta M. Steinfort, M.A., Associate Professor of Spanish
Florence C. Stehn, M.A., Assistant Professor of French
Ruth A. Miller, M.A., Instructor in Spanish (part-time)
Gertrude K. Stoessel, B.S., Instructor in French (part-time)
Robert H. Weidman, Ph.D., Instructor in French and German

French

1a. First Semester French.* I, II. **4 credits.**

The primary object of this course is to teach the student to read simple French prose as a foundation skill to which other skills such as speaking, understanding, and writing may be added later. Grammar is presented from

the recognition or French-English point of view. The work also includes the acquisition of a vocabulary of 500 words based on the Vander Beke word count, selected idioms from the Cheydleur list occurring in the texts read, pronunciation, ear training.

1b. Second Semester French.* I, II. **4 credits.**

The work of the preceding semester is continued with review of grammar, an additional 500 word vocabulary, continued study of idioms, the writing of simple French, oral and aural practice. Attention is given to the culture of the French people.

Prerequisite: French 1a or one year of high school French.

10a. Third Semester French.* I, II. **3 credits.**

The primary object of the course is to increase the reading ability acquired in the first year. The vocabulary of French 1a and 1b is reviewed, and the study of idioms based on the Cheydleur list is continued. There is also a review of irregular verbs and pronunciation. Grammar is reviewed and studied in connection with the texts read and as contributing to their better understanding. Opportunity is afforded for oral and aural practice. Students who expect to benefit most from the course are given an opportunity to do out-of-class reading.

Prerequisite: French 1b or two years of high school French.

10b. Fourth Semester French.* I, II. **3 credits.**

French 10b continues the work of Course 10a. Vocabulary study is continued with a second list consisting of 1000 words based on the Vander Beke word count. Attention is given to the literary aspects of the works read with a view toward establishing an appreciation of French literature.

Prerequisite: French 10a or three years of high school French.

15a. Elementary Composition and Conversation.* I. **2 credits.**

This is a supplementary course to be taken with French 10a. It is not open to students who have had the equivalent of two years of college French, except by special permission.

15b. Elementary Composition and Conversation.* II. **2 credits.**

This is a continuation of Course 15a. It is open to properly qualified new students.

21a. Elementary Survey.* I. **3 credits.**

French 21a is a third year course planned to cover French literature in outline, with illustrative readings from the principal periods, movements, and writers. The course includes a study of the literary aspects of the works read, and literary history. This course or its equivalent is prerequisite to all advanced courses in French literature.

Prerequisite: French 10a and French 10b or four years of high school French.

21b. Elementary Survey.* II. **3 credits.**

This is a continuation of Course 21a. It is open to properly qualified new students.

Spanish

1a. First Semester Spanish.* I. **4 credits.**

Spanish 1a includes careful training in pronunciation, much oral and aural practice, a study of the fundamentals of grammar, and the acquisition of a vocabulary of at least 500 words used in the oral work and reading and checked with the Spanish word and idiom lists. The reading of simple Spanish is started early in the semester. In addition, students are required to do outside reading in English on the history, life, and customs of the Spanish and Latin-American peoples.

1b. Second Semester Spanish.* II. **4 credits.**

Spanish 1b continues the practice in pronunciation and oral work, the study of grammar, and the acquisition of basic vocabulary and idioms. The reading of Spanish in class is supplemented by easy readings in the foreign language outside of class.

Prerequisite: Spanish 1a or one year of high school Spanish.

10a. Third Semester Spanish.* I. **3 credits.**

Spanish 10a continues the study of the Spanish people through the reading of a number of novels, short stories, and plays by the best modern authors. Oral and written work is based on the reading. There is a review of grammar with additional finer points in syntax; also a further study of vocabulary and idioms.

Prerequisite: Spanish 1b or two years of high school Spanish.

10b. Fourth Semester Spanish.* II. **3 credits.**

Spanish 10b is a continuation of the work of Course 10a with an increase in the amount and degree of difficulty of reading. More extensive oral and written reproduction of content in Spanish is required.

Prerequisite: Spanish 10a or three years of high school Spanish.

20a. Elementary Conversation and Composition.* I. **2 credits.**

This is a supplementary course to be taken with Spanish 10. It is not open to students who have had the equivalent of two years of college Spanish, except by special permission.

Prerequisite: Spanish 1b or equivalent.

20b. Elementary Conversation and Composition.* II **2 credits.**

This is a continuation of Course 20a. It is open to properly qualified new students.

Prerequisite: Spanish 20a.

21a. Elementary Survey.* I. **3 credits.**

Spanish 21 comprises a brief study of the history and the development of all types of Spanish literature—the epic, the drama, prose writings, lyrics, the novel—covering the centuries from 1140 to the present. This study is centered around and illustrated by the reading and interpretation of representative works of each type.

Prerequisite: Spanish 10b or equivalent.

21b. Elementary Survey.* II. **3 credits.**

This is a continuation of Course 21a. It is open to properly qualified new students.

German

Charles M. Purin, Ph.D., Professor of German, Chairman
Frieda A. Voigt, B.A., Instructor in German
Robert H. Weidman, Ph.D., Instructor in German and French

1a. First Semester German.* I, II. **4 credits.**

Training in pronunciation is given through oral and aural exercises to insure fluency in reading. A minimum of 500 most frequent words and some 40 of the most frequent idioms are mastered. Essentials of grammar are covered exclusive of the passive voice and the subjunctive. The grammatical topics included are declensions, conjugations, case government, and word order. The reading requirement, in English, is some 100 pages on Germany and its institutions. The texts read in class are Heath's **Graded German Readers,** Book I-V.

1b. Second Semester German.* I, II. **4 credits.**

Grammar essentials are reviewed. The special topics for this semester are the subjunctive and the passive. Approximately 600 additional most frequent words and about 60 idioms are mastered. The required reading, in English, is some 100 pages on German culture and civilization. Heath's **Graded German Readers,** Books VI-X are read in class and approximately 100 pages outside.

Prerequisite: German 1a or one year of high school German.

2a. Third Semester German.* I, II. **4 credits.**

Some 200 pages of narrative and dramatic prose, with oral and written reproduction, are read in class, and about 250 pages of intermediate grade outside. An additional 700 of the most frequent words and some 100 idioms are mastered. Types of texts used in class: Bonsel's **Die Biene Maja,** Purin-Rose **Kulturkunde,** Hofrichter-Stroebe **Leicht und Neu.**

Prerequisite: German 1b or two years of high school German.

2b. Fourth Semester German.* I, II. **4 credits.**

Some 300 pages of novelistic literature and lyrics are read in class and some 300 pages outside. Purin's **Standardized German Vocabulary** is mastered. Composition work is based on the texts read. Types of texts used in class: Röseler's **Moderne Erzähler,** Hauptmann's **Einsame Menschen,** and Keller's **Romeo und Julia auf dem Dorfe.**

Prerequisite: German 2a or three years of high school German.

10. Intermediate Composition and Conversation.* Yr.
2 credits each semester.

Written exercises and grammar review, with discussion in German.

Prerequisite: Four credits in advance of German 2b, or a grade of **B** in German 2b.

15. Classical and Modern Writers.* Yr. **3 credits each semester.**

Reading, composition, and oral practice.

Some 400 pages are read in class and an equal amount outside. Types of texts used in class: Grillparzer's **Des Meeres und der Liebe Wellen,** Goethe's **Hermann und Dorothea,** Fleissner's **Der junge Goethe.** Outside reading: Storm's **Der Schimmelreiter,** Mann's **Tonio Kröger,** and Schiller's **Wilhelm Tell** or **Jungfrau von Orleans.**

Prerequisite: German 2b or equivalent.

Polish

Szymon St. Deptula, M.A., Instructor in Polish

1a. Elementary Polish.* I. **4 credits.**

This is an introductory course for students with no previous knowledge of Polish. Practice in pronunciation is afforded through phonetic study and drill. Declension of nouns, adjectives, and pronouns with constant review of vocabulary and grammar by means of dictation, quizzes, and drill constitutes the greater part of the semester's work.

1b. Second Semester Polish.* II. **4 credits.**

A continuation of Polish 1a, this course is designed for students without any previous formal knowledge of Polish grammar. Further practice in pronunciation is given through phonetic study and continuous repetition and correction. In grammar the verb is taken up, and the grammatical material of the first semester reviewed. The classwork consists of dictation, short quizzes, written and oral exercises, and daily drill in declensions and conjugations. Particular attention is paid to vocabulary-building exercises. Conversation and reading in easy Polish prose supplement the grammatical drill and review.

2a. Intermediate Polish.* I. **4 credits.**

The content of the course includes a detailed review of declensions and conjugations; special drills in vocabulary and idioms, especially the current words not likely to be included in even the newest dictionaries; oral and written exercises and composition; conversation on everyday and current events and topics; frequent quizzes in dictation, grammar, and translation; and reading in fairly difficult Polish prose and poetry.

2b. Fourth Semester Polish.* II. **4 credits.**

This course continues the work of Polish 2a.

3a. Advanced Polish.* I. **3 credits.**

This course is open to those who read Polish with ease and who are acquainted with the fundamentals of Polish grammar. The content of the course consists of a final rapid topical review of grammar, with emphasis laid upon the theory and the "rules" that govern certain grammatical peculiarities of the Polish language. The reading material includes the work of Sienkiewicz, Reymont, and other outstanding prose writers. Original

literary translations from the Polish into English are prepared for publication.

The course is recommended to teachers of Polish, present or prospective, as well as to those who are interested in mastering Polish thoroughly for business, professional, or cultural reasons.

3b. Advanced Polish.* II. **3 credits.**

This is a continuation of Polish 3a. Emphasis is placed upon conversational Polish, translation of literary prose, and grammatical drill.

4a. Masterpieces of Polish Literature.* I. **2 credits.**

The aim of this course is to acquaint the student, through lectures, discussion, and extensive reading, with the major masterpieces of Polish literature from the sixteenth century through the first half of the nineteenth. The course is conducted in Polish.

4b. Modern Polish Literature.* II. **2 credits.**

This course is a sequel to Polish 4a. The content of the course consists of wide reading, reports, and lectures in Polish literature since 1863, with the emphasis placed upon the key works of representative authors.

5a. Polish Romantic Poetry of the 19th Century.* I. **2 credits.**

This is a course designed to acquaint the student with the most brilliant period of Polish literature. The student reads widely in the masterpieces of the three greatest Polish poets: Mickiewicz, Slowacki, and Krasinski.

The course is recommended to those who read Polish with ease and wish to become acquainted with the chief poetic and dramatic works of Polish literature.

5b. Technical Polish and Advanced Translation from Polish into English* II. **2 credits.**

This course is designed for those who know Polish grammar and language and who wish to translate technical articles or Polish literary prose into literary and readable English. By the end of the semester, the student is obliged to translate a certain number of longer technical articles or one play or several short stories. All translations are prepared for publication.

MATHEMATICS AND ASTRONOMY

George A. Parkinson, Ph.D., Associate Professor of Mathematics, Chairman
Morris Marden, Ph.D., Assistant Professor of Mathematics
William E. Roth, Ph.D., Assistant Professor of Mathematics
Ross H. Bardell, Ph.D., Instructor in Mathematics and Astronomy
Edward A. Nordhaus, M.S., Instructor in Mathematics
John I. Vass, Ph.D., Instructor in Mathematics
Louise A. Wolf, Ph.D., Instructor in Mathematics
Howard Zoerb, B.S., Instructor in Mathematics (part-time)

1. College Algebra.* I, II. **4 credits.**

College Algebra is strongly recommended for all students in commerce and may be offered as an elective in any four year course in the College of Letters and Science.

The following subjects are taken up: logarithms; simultaneous, linear, and quadratic equations; binomial theorem; progressions; compound interest; probabilities.

Prerequisite: One year of high school algebra or its equivalent.

Students who have had three semesters of high school algebra, see chairman of department.

Students who have had two years of algebra in high school are not permitted to take this course for credit.

2. Trigonometry and Analytic Geometry.* I, II. **4 credits.**

This course is a combination of what was formerly Mathematics 2 and Mathematics 4. The following subjects are discussed: trigonometric functions; identities; logarithms; solution of right and oblique triangles; systems of coordinates; transformations of coordinates; the straight line; conic sections, and special curves. This course completes the student's preparation for Calculus.

Prerequisite: One and one-half units of high school algebra or college algebra.

3. Analytic Geometry.* I, II. **3 credits.**

Analytic geometry is prerequisite or co-requisite for calculus for Letters and Science students.

The following subjects are discussed: Cartesian coordinates; polar coordinates; transformation of coordinates; the straight line; conic sections; tangents and normals; the general equation of the second degree; transcendental and parametric equations.

Prerequisite: High school trigonometry. Students may take this course simultaneously with Mathematics 5a.

5a. Differential Calculus.* I, II. **3 credits.**

Students who intend to major or minor in mathematics or science are advised to take this course, together with course 5b, in the sophomore year. It corresponds roughly to Mathematics 54, 4 credits, offered primarily for engineering students but is open to others.

Prerequisite (or co-requisite): Mathematics 2 or 3.

5b. Integral Calculus.* I, II. **3 credits.**

Prerequisite: Mathematics 5a.

54. Differential and Integral Calculus.* I, II. **4 credits.**

For description, see page 67.

55. Integral Calculus.* I, II. **4 credits.**

For description, see page 67.

6. Determinants and Analytic Geometry of Three Dimensions.* II. 3 credits.

All undergraduate majors in mathematics are required to take this course. Content of course: systems of coordinates; the equation of a surface; projections; direction cosines; change of axes; the plane; the straight line; the sphere; the cone; conicoids; axes; generating lines; the general equation of the second degree.

Prerequisite (or co-requisite): Mathematics 5a or 54.

7. Theory of Investment.* I, II. 4 credits.

Students in the Commerce Course are required to take this course. The following subjects are taken up: interest annuities, amortization, bonds, sinking funds, depreciation, and building and loan associations.

Prerequisite: Mathematics 1 or 51 or two years of high school algebra.

101. Advanced College Algebra.* Yr. 3 credits each semester.

This course consists of two parts of three credits each. Part a covers the following topics: permutations and combinations; interpolation, differences, summation formulae, smoothing; determinants, matrices, linear dependence; partial fractions; continued fractions.

Part b is the usual course in the theory of equations and covers elementary theorems on roots of algebraic equations, the solution of cubic and quartic equations, approximation of roots, impossibility of certain ruler and compass constructions, the fundamental theorem of algebra, and related topics.

The course is of special interest to actuaries, engineers, teachers, and others who require a knowledge of higher algebra in their work or who seek advancement in their professions.

Prerequisite: Calculus or concurrent registration in Mathematics 5b or 55.

Offered 1936-37.

103. Advanced Geometry.* Yr. 3 credits each semester.

In this course the methods of elementary analytic geometry are extended to the analytic and synthetic projective geometry of the plane. Some of the subjects discussed are: linear equations and linear dependence; homogeneous Cartesian coordinates; harmonic division; line coordinates; cross ratio; transformations; and metric geometry of the complex plane. The principles developed in the early part of the course are applied to rectilinear figures and conic sections.

Prerequisite: Mathematics 6 or consent of instructor.

Not offered 1936-37.

111. Review of Calculus.

For description, see page 67.

112. Differential Equations.* II. 3 credits.

Not to be taken by mathematics majors. For description, see page 68.

Nine-inch Reflecting Telescope

117. Vector Analysis.* II. **3 credits.**

This course is an introduction to the study of vectors and vector functions with special applications in the fields of geometry, physics, and mechanics. Some of the subjects taken up are: the algebra of vectors including vector and scalar products; differentiation of vectors and vector differential operators.

Prerequisite: Calculus.

119. Introduction to Differential Geometry.* II. **3 credits.**

Course 119 provides an introduction to the differential geometry of space curves, curves and surfaces associated with space curves, and the fundamentals of the theory of curved surfaces. The Vector Method of presentation is used because of its simplicity and effectiveness. Since the necessary vector analysis is presented at the beginning of the course, a previous course in vector analysis is not required. The student should have completed or should be concurrently registered in a course in the analytic geometry of three dimensions. The course is especially recommended for mathematics majors and minors. Other students should obtain the consent of the instructor before registering.

Astronomy

1. Astronomy.* II. **3 credits.**

The object of this course is to give the student an understanding of the problems which confront the astronomer and of the methods by which these problems are attacked. Some of the subjects considered are: the earth, moon, sun, and planets; theories of the evolution of the solar system; motions, physical properties, and distribution of the stars. One night each week, if the sky is clear, is devoted to observation. Mathematics is not required for this course.

The course is not open to first semester freshmen.

6. Navigation.* II. **2 credits.**

For description, see page 68.

PHYSICS

Miles J. Martin, Ph.D., Associate Professor of Physics, Chairman
T. Alton Rouse, Ph.D., Assistant Professor of Physics
Earl R. Bell, M.A., Instructor in Physics

1a. General Physics.* I. **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

The following subjects are treated: mechanics, heat, magnetism, and static electricity. The course is open to any Letters and Science student.

1b. General Physics.* II. **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

The following subjects are treated: current electricity, sound, and light. Students entering the second semester who have had high school physics may take this course with the consent of the chairman of the department.

Prerequisite: Physics 1a.

7. Photography.* II. **2 credits.**

One hour lecture-recitation; three hours laboratory. Lab. fee, $4.50.

This course deals with the science of photographic processes. Laboratory work consists of experiments in exposure, developing of negatives, making of prints, enlarging, and other photographic techniques.

Prerequisite: Consent of instructor.

119. Radiation, Ultraviolet to Infrared.* I. **1 credit.**

The course consists of a series of lectures on the physical nature of light with particular reference to ultraviolet, infrared, and Xrays, and their present day applications. The course should be of interest to medical students, nurses, and the general public. It should be of interest to the public because of the increasing role that radiation of all kinds is playing in modern life.

Prerequisite: Physics 1b or equivalent.

Physics Laboratory

POLISH, see page 99.

PSYCHOLOGY

Lewis E. Drake, Ph.D., Assistant Professor of Psychology

1. Introduction to Psychology.* I, II. **3 credits.**

This is an introductory survey of psychology in regard to material, fundamental laws, applications, and relations to other sciences. The specific topics covered are: physiological and neurological basis of behavior, learning and habit formation, attention, imagination, thinking, personality and character, intelligence, insanity and dissociation.

Prerequisite: Sophomore standing.

50. Applied Psychology.* II. **2 credits.**

The topics covered are: vocational guidance and choice; personnel; salesmanship; advertising; applications of psychology to law, medicine.

Prerequisite: Psychology 1.

100. Seminar in Problems in General Psychology.* II. **1 credit.**

This is a discussion and reading course in which the student is permitted to follow a line of study which may be of particular interest to him.

Prerequisite: Psychology 1 and instructor's permission.

144. Applied Psychology of Learning. I, II. No credit.

This is a laboratory course devoted to the establishment of effective study habits. An intensive study is made of principles underlying academic work such as budgeting time, efficient reading, recitation methods, note making, and organization of knowledge. Extensive practice is given in the skills involved.

The course is open to any freshman or sophomore and requires no fee.

147. Genetic and Child Psychology.* II. 3 credits.

A study is made of the development of behavior from one-cell organisms to man correlated with the structural development with emphasis on the growth of the human being.

Prerequisite: Psychology 1.

Business Psychology, see page 43.

SOCIOLOGY AND SOCIAL WORK

Philip H. Person, Ph.D., Associate Professor of Sociology, Chairman
Kimball Young, Ph.D., Professor of Social Psychology (Madison and Milwaukee)
Elizabeth A. Kletzsch, B.A., Instructor in Sociology (part-time)

1. Sociology.* I. Day class—3 credits; Evening class—2 or 3 credits.

This is an introductory course to the study of sociology and is required of students majoring in sociology. The course deals with the environmental, racial, and psychological foundations of society. A study is made of the fundamental social institutions and of how these institutions adapt themselves to the demands of changing conditions of life and living. The lectures, readings, and discussions are planned to make clear the nature of the organization of our social structure and the means by which the members of society are controlled and directed.

Prerequisite: Full sophomore standing. (25 credits and 25 grade points.)

2. Sociology.* II. Day class—3 credits; Evening class—2 or 3 credits.

This course deals with the nature of social change and the problems of social adjustment; problems of population; eugenics; race relations; problems of the family; changing status of women and children; social hazards of industrial life; group conflict; war; dependency and correction; problems of socialization. The lectures, readings, and discussions are planned to reveal how the social order is constantly changing and in what direction sound adjustments are tending.

Prerequisite: For sociology majors, Sociology 1; for others, full sophomore standing.

139. Social Psychology.* 2 or 3 credits.

In our modern world of increasing complexity, human behavior varies directly with increasing participation in a variety of group ideas and social situations.

Social behavior, as related to emotions, habits, fantastical and objective thinking on the one hand, and to prejudice, mental epidemics, propaganda, mobs, crowds, audiences, on the other, is analyzed.

Prerequisites: Psychology 1 and junior standing, or major in sociology.

141. Poverty and Dependency.* I. **2 or 3 credits.**

Course 141 is designed for social investigators, teachers, and others interested in social welfare. The course offers training and credit for those who qualify and are interested in entering the field of social work. The subjects taken up include: the extent of poverty and pauperism; causes of poverty and dependency; historical methods of dealing with dependents; epileptic, dependent children; preventive agencies and methods.

Prerequisites: For Sociology majors, Sociology 1 and 2; for others, junior standing.

160. Marriage and Family in America.* **2 credits.**

What is the effect of social and economic changes on present day marriage and the functions of the American family? Does the fact that the divorce rate is increasing mean that the institution of the family is a failure? Will the contribution of some of the newer psychological insights into marriage problems be of any value?

Prerequisites: For sociology majors, one course in Sociology or Anthropology; for others, junior standing and consent of instructor.

161. Criminology and Penology.* II. **2 or 3 credits.**

This course deals with crime and criminals: extent, cost, causation, punishment and treatment, institutions, probation and parole, and the courts.

Special attention is given throughout to the problem of juvenile delinquency and its bearing on the problem of crime as a whole.

Prerequisites: For sociology majors, Sociology 1 and 2 or concurrent registration in 2; for others, junior standing.

164a. Case Work Theory.* **2 credits.**

The subjects taken up include: the function of the first interview; the use of sources such as relatives, employers, schools; the methods of social diagnosis and of planned formulation for rehabilitation purposes. Special attention is given to problems of unemployment.

Prerequisite: Senior standing or consent of instructor. This course is offered for credit in the University provided the student does not elect either Course 147 or Course 148 in residence.

164b. Case Work Theory.* **2 credits.**

Consideration is given to case work treatment of the executive and leadership types, for such groups as the unemployed, the unmarried mother, transients, the deserted family, the delinquent child; and to principles of interviewing, with particular emphasis on the theory of relationships.

Prerequisite: Sociology 164a, senior standing, or consent of instructor. This course is offered for credit in the University provided the student does not elect either Course 147 or Course 148 in residence.

167. Contemporary Social Movements. I. **2 credits.**

Industrial change brings social unrest, which creates organized movements in society looking to a solution. Among these movements are those popularly designated as socialism, fascism, communism, labor unionism, the cooperative movement, and the peace movement. It is the purpose of this course to analyze these various movements from the point of view of their adherents, and to evaluate their effects, individually and collectively, in terms of the present order of society. Special attention is given to the co-operative movement.

Prerequisite: Junior standing or consent of instructor.

197. Personality and Social Adjustment.* **2 or 3 credits.**

In this course personality is treated from the angle of group participation, especially in the family, play group, gang, neighborhood, school, church, and various community groups. Literature on problem children, juvenile delinquency, and adolescence is examined critically.

Prerequisites: Psychology 1 or Sociology 139, and junior standing.

12. Community Resources **No credit.**

This is a one-hour lecture course describing the purpose and administration of the charitable, curative, reformatory, and penal institutions and agencies within the city and state, with brief reference to the services offered by the federal government to the local community. The organization and function of the agencies providing care for neglected, dependent, or delinquent children, for the aged, for veterans, for the tubercular, the blind, the deaf, the mentally deficient or the mentally unbalanced are discussed in detail.

13. Interviewing. **No credit.**

The ability to use the interview as a tool and to weigh the results of its use is a skill which it is well for everyone to develop. In this course interviews in the fields of vocational guidance, employment, industrial relations, social case work, education, and journalism are discussed. The experiences of the class are used as a basis for developing analytical ability and skill in the student.

Social Security Legislation, see page 43.

SPANISH, see page 97.

SPEECH

George A. Kopp, Ph.D., Assistant Professor of Speech, Chairman (On leave, 1936-37)

Lyman S. Judson, Ph.D., Assistant Professor of Speech, Acting Chairman, 1936-37

Raymond G. Weihe, M.A., Instructor in Public Speaking (part-time)

1. Fundamentals of Speech.* I. **3, 2, or 1 credits.**

For one credit, the lecture course is designed to give the student an understanding of the speech function and the principles of effective speech.

For two credits, the recitations are devoted to practice, analysis of individual performance in speech, and suggestions for improvement.

For three credits, the recitations and lectures are as described above.

Students who expect to take further work in the department should elect Speech 1 in their sophomore year if possible. Not more than three credits may be earned in any combination of Speech 1 and Speech 7, and such combination must include the lecture hour of Speech 1.

Prerequisite: Open to all students except freshmen.

2. Fundamentals of Speech.* II. **3 credits.**

The purpose of this course is to formulate certain fundamental principles of speech and to be able to apply them in various speaking and reading situations. The first half of the semester is devoted to the formulation and exemplification of these principles; the second half to their application. The principles considered are: perception, attention, motivation, empathy as applied to interpretative reading, discussion, conversation, public address, and debate. The second half of the semester is devoted to a series of projects testing the student's understanding of and proficiency in applying the foregoing principles. These projects are in reading literary material; in leading discussions; in conducting a business meeting; in preparing and delivering simple examples of all types of speeches. Further to insure an understanding of these principles, each student makes a semester study of some successful speaker or reader.

Prerequisite: Speech 1.

7. Public Speaking.* I, II. **2 credits.**

This is a practical course to help business and professional men and women in their speaking, both in public and in private. A maximum of platform work is required of each student. The theory offered is applied, immediately, to actual speaking situations. The course is designed to teach the individual to prepare and deliver speeches creditably.

Prerequisite: Sophomore standing.

8. Extempore Speaking.* Yr. **2 credits each semester.**

Required of freshman physical education men. For description, see page 74.

9. Parliamentary Practice.* I. **2 credits (noncredit with permission)**

In this course careful study is made of rules of procedure. There is a maximum amount of actual practice in conducting meetings. Satisfactory completion of the course should enable the student to preside over, or to take an intelligent part in, any organized meeting.

Prerequisite: Sophomore standing or consent of instructor.

16. Elements of Dramatic Expression and Acting.* I. **2 credits.**

This course treats of the elementary principles of creative dramatic thinking in both the preparation and interpretation of material for the stage. Rhythmics, poise, motion, freedom, control, character analysis,

elemental emotions and their portrayal, voice and diction, stage technique, and pantomime are stressed.

Prerequisite: Sophomore standing or consent of instructor.

19. Elementary Dramatic Production.* II. **2 credits.**

This is an elementary course in dramatics designed for those who have had no previous training. The following subjects are studied: choosing the play, choosing the cast, rehearsing, the stage, lighting, scenery, costumes, make-up, and pantomime. The classroom is considered a laboratory in which practice and individual attention are stressed.

Prerequisite: Sophomore standing and consent of instructor.

For information about The Clinic for the Correction of Speech Defects see page 17.

ZOOLOGY

Joseph G. Baier, Jr., Ph.D., Assistant Professor of Zoology, Chairman
Merlin L. Hayes, Ph.D., Instructor in Zoology and Botany

The laboratory science requirement may be removed by taking Animal Biology 1 and Zoology 104, or Animal Biology 1 and Botany 1, or Botany 1 and Botany 2. If Animal Biology 1 and Botany 1 are chosen to satisfy the science requirement, either one may precede the other, at the student's discretion.

1. Animal Biology.* I, II. **5 credits.**

Two hours lecture; two hours quiz; four hours laboratory. Lab. fee, $8.00.

This course is preliminary to all advanced work in Zoology. A study is made of biological principles as illustrated by animals. The cell theory, adaptations, classification, morphology and physiology of organ systems, embryology, heredity, and evolution are considered. The laboratory work includes the anatomy, physiology, embryology, and histology of the frog, and comparative studies on protozoa and hydra.

This course combined with Zoology 104, or with Botany 1, satisfies the natural science requirement.

104. Comparative Anatomy of Vertebrates.* II. **5 credits.**

Three hours lecture; six hours laboratory. Lab. fee, $10.00.

The lectures compare the structure and development of the organ systems in the different vertebrate groups, including physiology wherever advisable. Special reference is given to the comparison and evolution of the organ systems. The laboratory work includes the dissection of the shark, the mud puppy, and the cat, with comparative references to other vertebrates, including man.

Prerequisite: Animal Biology 1.

Limited enrollment. Students with a grade below C in Zoology 1 not admitted except by permission of the department.

106. Heredity and Eugenics.* I. 2 credits (noncredit by permission)
Two hours lecture; one hour quiz.

This course includes a comprehensive study of the principles of heredity, their application to man, and their significance in the improvement or deterioration of the human race.

Prerequisite: Sophomore standing.

TECHNICAL INSTITUTE COURSES

As a result of an extensive investigation of Engineering and Technical Education in Europe, the United States, and Canada, conducted by the Society for the Promotion of Engineering Education, American educators and industrialists have become aware of the fact that a type of educational facility highly developed and successful in Europe—the Technical Institute—is lacking in the American educational plan. The Technical Institutes of Europe are described as follows by Mr. W. E. Wickenden, formerly Director of Investigation for the Society for the Promotion of Engineering Education and now President of the Case School of Applied Science:

> "Through great diversity of name, organization, and program runs a common warp of distinctive characteristics; they are not trade schools, nor are they preparatory schools for higher studies; their courses are of terminal character and are intended for young men already oriented to industry, who wish intensive preparation for definite lines of advancement; most of the students are not bookminded; direct processes of teaching and learning are employed, and most of the student's work is done on the premises. The entire process is pointed to the higher practical pursuits of industry, rather than to its highly intellectual functions. In addition to engineering courses of a fairly general, though practical character, these schools provide nearly all the higher training in the technology of specific industries and training for particular technical functions."

It has long been recognized that there is a need in Wisconsin, especially in the Milwaukee industrial area, for an educational activity of the same general character as that of the Technical Institute, which trains young men for the semiprofessional fields which exist between the skilled craftsman and the trained professional engineer. Because of this need the University Extension Division of the University of Wisconsin is offering at its Milwaukee Center day educational programs for those properly qualified young men who desire to enter one of the semiprofessional fields and thus spend less than the usual four-year period in academic training. The general idea of these educational programs, although patterned after the plan of the technical institutes, has been modified to meet existing conditions in Wisconsin and the United States.

At the present time there are available to young men a two-year day program in **Building Design and Construction** and a one year course in **Radio Communication.**

The prerequisite for entrance to these courses is high school graduation or its substantial equivalent. The requirements of the course are exacting

and strenuous. Each applicant for admission is judged solely on his ability to carry the work and to profit by it.

The method of instruction employed differs somewhat from the conventional method. Each student may start his course at a point in the work where his ability and previous training permit. It is possible for him to work as slowly or as rapidly as he desires. The instruction is substantially of a collegiate grade and is under the direction and supervision of properly qualified teachers who are mature and experienced in the engineering technical fields.

The technical institute type of courses offered in Milwaukee aims to train young men for the so-called semiprofessions, those vast fields of activity between the skilled craftsmen and the trained professional engineers.

Certificates

University of Wisconsin Extension Division certificates are issued to those who have successfully completed a course of study in the Technical Institute. These certificates are recognized in business and industry and by the public at large as standing for a very definite attainment.

Courses to Fit Individual Needs

In addition to the courses in **Building Design and Construction** and in **Radio Communication,** it is possible, by conferences with the members of the Guidance Bureau, to arrange special combination courses to suit individual needs. These special courses can be made up from the four other fields offered in the Milwaukee Center—Business, Letters and Science, Engineering, and Liberal Education.

TWO-YEAR DAY COURSE IN BUILDING DESIGN AND CONSTRUCTION[1]

This specialized, intensive, two-year course gives training for positions connected with the design and construction of buildings. It is of particular interest to men who wish to become building inspectors, construction superintendents, structural or architectural draftsmen, or structural designers. The training given in this course will qualify the student for positions of substantial responsibility after a little practical experience. This is especially true if the student secures part-time employment along constructive lines while attending school. This experience will be of great value to him not only in securing a position after completing the course but also in getting a better understanding of the application of theory to practice.

FEES

The cost of this course is $75 a semester. An additional laboratory fee of $2.25 is charged for the course in surveying. Part-time work may be taken. For information on deferred payments, see page 10.

LIST OF STUDIES

First Year

First Semester		Second Semester	
Mathematics 403	4	Mathematics 404	4
Structural Theory 402	4	Structural Theory 412	6
Drawing 405	6	Structural Drafting 413	6
Concrete Work 407	2	Estimating 414	2
Materials of Construction 415	2	English 411	2
English 409	2		—
	—		20
	20		

Second Year

First Semester		Second Semester	
Steel Buildings 421	6	Reinforced Concrete 430	7
Reinforced Concrete 420	6	Contracts and Specifications 431	1
Estimating 422	2	Special Problems 434	1
Foundations 423	2	Roof Truss Design 432	6
Stresses in Trusses 424	3	Reports 433	1
Construction Plant 425	1	Surveying 410	3
	—	Inspection Trips 438	1
	20		—
			20

[1] A special bulletin, giving more detailed information, may be had on application.

DESCRIPTION OF COURSES

403. **Mathematics.** The first part of the course includes a review of the elementary algebraic operations with emphasis on factoring and the solution of simultaneous and quadratic equations. The latter part of the course includes the study of logarithms and trigonometric functions, practice in the use of tables and the slide rule, and the solution of right and oblique triangles. One year of high school algebra is desirable as a foundation.

402. **Structural Theory.** Some of the topics treated are: forces; tension; compression; shear; unit stresses; rivets; modulus of elasticity; reactions; center of gravity; moment of inertia. The handbook of the American Institute of Steel Construction is used in connection with the text. The use of the slide rule is required in solving the various problems.

405. **Drawing.** This subject covers the underlying principles of perspective, isometric, and orthographic projections, with illustrative problems. Students are required to work both on paper and tracing cloth.

407. **Concrete Work.** This is not a design course but comprises the development of scale working drawings of a concrete building, together with the treatment of excavations; placing concrete; placing steel; amount of materials per cubic yard of concrete; mixing; amount and size of lumber for form work; placing of forms; and many other topics.

415. **Materials of Construction.** This is a short course giving the student the fundamentals regarding the production and manufacture of the ordinary materials used in construction.

409. **English.** The work consists in the writing of a series of papers, preferably on the subject of pure or applied science, the discussion of effective writing technique, and the discussion of selected essays, which serve partly to stimulate interest in diverse fields or aspects of science, and partly to show how effective writing is done. The chief difference between this course and the customary one in Freshman English is the emphasis on science; the standards are the same.

404. **Mathematics.** This second semester of practical mathematics stresses the application of the principles of plane and solid geometry to problems in the building of ordinary structures and machines. Typical topics are: dimensions and areas of plane figures such as rectangles, right triangles, and circles; dimensions, surface areas, and volumes of such solids as prisms, pyramids, cones, and spheres; laying out and cutting of rafters for various types of roofs. Constant use of the slide rule is required.

412. **Structural Theory.** Through this course the student acquires a knowledge of the fundamental facts and theories as well as the ability

to apply this knowledge to practical problems. The course is of value to the shopman, draftsman, and designer. It must be completed before any of the design courses are taken up. The application of forces to cranes, derricks, and trusses is covered both graphically and analytically. Among the topics treated are: concurrent forces; types of trusses; loadings and friction.

413. **Structural Drafting and Steel Handbook.** The student starts with simple structural details and advances gradually to the more complicated. The work conforms to standard drafting room practice. The handbook of the American Institute of Steel Construction is used in connection with the work of this course.

414. **Estimating.** The practical methods of estimating used by builders and contractors are taught in this course. Quantity survey problems pertaining to the various branches of construction such as excavating, mason work, steel work, carpentry, and plastering are worked out in the classroom. Sweet's catalog of current issue is used as a descriptive reference.

Course 414 is preparatory to Course 422.

411. **English.** A continuation of 409.

420. **Reinforced Concrete.** This course teaches the fundamentals regarding the design of reinforced concrete beams, slabs, and columns. The following are some of the topics treated: steel and concrete in combination; rectangular beams; web reinforcement; slabs; T-beams; beams with steel top and bottom; and columns.

421. **Steel Buildings.** Many practical considerations in connection with the design of buildings are considered. Numerous designs are required with detail drawings. Floor designs with special attention to the economical arrangements of beams and girders are worked out.

422. **Estimating.** A thorough training is given in the preparation of a quantity survey, covering such items as enter into the construction of a building, namely, concrete, brick, steel, and lumber. From actual plans the student is required to make quantitative estimates covering the various branches of construction and to list the results in such a manner as to facilitate making a cost analysis.

423. **Foundations.** The following are a few of the subjects treated: soil investigations; tests to determine soil conditions; bearing power of soils; excavations; general considerations; preliminary investigations; distribution of pressure; spread footings; timber; and concrete piles.

424. **Stresses in Trusses.** Stresses in different types of trusses due to various loadings are worked out by the student. Both the algebraic and graphic methods are used.

425. **Construction Plant.** Various problems regarding the size and location of the plant are discussed in the class. The class is taken to see plants in operation on various kinds of construction work.

430. **Reinforced Concrete.** This subject is an application of the theory of the first semester's work in reinforced concrete. The student works out designs involving floors of various types, a roof panel, columns, various types of footing, and both gravity and reinforced retaining walls. Detail drawings are required.

431. **Contracts and Specifications.** This subject covers the elementary principles of contracts and gives the student practice both in interpreting and in writing specifications.

434. **Special Problems.** Under this heading are included shear and moment in beams and trusses due to moving loads, influence lines, eccentric riveted connections, continuous beams, and wind bracing.

432. **Roof Truss Design.** The complete design of two roof trusses is required, one of timber and the other of steel. Detail drawings are required.

433. **Reports.** Two or more topics are assigned to each student during the semester. The topics are on various engineering subjects. Talks are prepared on the assigned subjects and presented before the class.

438. **Inspection Trips.** The class is taken out from time to time to visit construction work of special interest. The student makes a written report on each trip.

410. **Surveying.** Lab. fee, $2.25. The first half of the semester is devoted to classroom work and the second half to outside problems. The student learns the use of the tape, level, and transit. He should be able to run ordinary levels and to stake out foundations for buildings after completing this course.

ONE-YEAR DAY COURSE IN RADIO COMMUNICATION[1]

Hans Hjermstad, Instructor in Radio.
Hans Sauer, Instructor in Radio.

There has been a long felt need in the radio field for a school of recognized standing that offers a complete and comprehensive course in Radio Communication which can be finished within a reasonable time. Realizing this need the University of Wisconsin Extension Division in Milwaukee is giving such a course to fit students for responsible positions in this field. This is a new type of training of a semi-professional nature the object of which is to train young men for the positions which exist in that field between the skilled craftsman and the trained professional engineer. The time required for the completion of the course is one school year of two semesters.

High school graduation is required for entrance, except in the unusual case where the student has had several years of practical experience in the radio field.

Upon the successful completion of the course, the student is prepared to take the United States government examination for a First Class Radio-Telephone License or a Second Class Commercial Operator's License.

Those who complete the course successfully are qualified for the following positions: radio telegraph operators, radio telephone operators, broadcasting station operators, air-craft radio operators, laboratory assistants, radio service men, factory inspectors, talking-movie maintenance men.

The course as outlined below is a presentation of the principles of radiotelegraphy and radiotelephony, together with correlated subjects necessary for a thorough understanding of the radio art. The program is an exacting one, demanding six hours of class work and at least four hours of outside study every day. The amount of work required is such that no part-time employment should be contemplated.

University of Wisconsin Extension Division certificates are issued to those who successfully complete the course of study in Radio. These certificates are recognized in business and industry and by the public at large as standing for a very definite attainment.

FEES

The tuition is $100 a semester. This includes all laboratory fees. Semester fees are payable at the time of registration. The cost of books for the entire course is approximately $30.

Arrangements may be made for the payment of fees in three installments with an extra charge of three dollars: $53 at the time of registration, $25 in 30 days, and $25 in 60 days.

[1] More detailed information may be secured by communication with the chairman of the Physics and Radio Department, Milwaukee Extension Center.

LIST OF STUDIES

First Semester	Hours	Second Semester	Hours
217 Elements of Radio Communication	10	281 Principles of Radio Communication	10
272 Radio Laboratory Practice	3	282 Radio Laboratory Methods	6
273 International Morse Code	10	283 International Morse Code	8
274 Design Fundamentals	6	284 Design Problems	4
275 Technical Mathematics	5	285 Technical Mathematics	5
276 Technical English	2	286 Technical English	2
		287 Special Lectures	2

DESCRIPTION OF COURSES

271. **Elements of Radio Communication.** The electron theory, electrostatics, direct current, magnetism, primary and secondary cells, motor and generators; inductance; capacity; alternating currents; vector diagrams; simple radio circuits; series, parallel, and series-parallel circuits; resonance; filters; transformers; types of coupling.

272. **Radio Laboratory Practice.** The laboratory is well equipped with modern apparatus for experimental and instructional work. The experiments follow the topics covered in Elements of Radio Communication, stressing the practical application of the principles involved. Experiments include various methods of measuring resistance, inductance, capacity. Reports are required with special attention to their preparation as engineering problems.

273. **International Morse Code.** Two hours' drill is provided every day in sending and receiving the International Morse Code. The code room is equipped with a Boehmé Automatic Transmitter, which sends from a perforated tape. This assures perfect, uniform characters at any desired speed. A Teletype Perforator is also part of the equipment so that exercises can be cut on a tape for class or individual drill.

274. **Design Fundamentals.** Engineering mechanical drawing; theory of orthographic projection; reading problems; freehand sketching; working drawings; vertical lettering.

275. **Technical Mathematics.** The essential phases of mathematics pertaining to the subject matter of Elements of Radio Communication and Laboratory Practice are considered with appropriate applications and numerous problems. Review of algebra, simultaneous equations, quadratics; trigonometry; logarithms; slide rule.

276. **Technical English.** The essentials of English pertaining to the engineer's use are given in this part of the course. The course includes the taking of notes and the making of outlines on lectures and reading; and the writing of reports on experiments, special investigations, and on outside reading.

281. **Principles of Radio Communication.** Types of radio receiver circuits and auxiliary apparatus, speakers, power supply. Types of transmitting circuits and auxiliary apparatus, microphones, power supply, antennae design. Theory and characteristics of all types of vacuum tubes for receivers, transmitters, and industrial applications.

282. **Radio Laboratory Methods.** Advanced work on measurements and calibration, following the topics covered in Elements of Radio Communication. Extensive study of vacuum tube characteristics and applications is made. Some time is available for the laboratory study of an approved problem of the student's interest.

283. **International Morse Code.** Continuation of 273 with special emphasis on speed, accuracy, and technique; message forms and regulations.

284. **Design Problems.** These problems involve the calculation of all values, such as, size of wire, number of turns, size of core, of various parts of a receiver, namely, the power transformer, voltage divider, filter system, audio amplifier, radio amplifier. Similar calculations are also made for a frequency meter and a sine generator.

285. **Technical Mathematics.** Geometry, analytic geometry, fundamentals of differential and integral calculus.

286. **Technical English.** Continuation of 276.

287. **Special Lectures.** A number of special lectures are given on current applications and developments of electronics, such as, television, photoelectric phenomena, and industrial applications.

CORRESPONDENCE-STUDY COURSES

The Correspondence-Study Courses offered by the University of Wisconsin, from Madison, provide individual instruction adapted to the special needs of each student. These courses, prepared and conducted by members of the University faculty, may be undertaken in the student's leisure hours at his home. Through them the University and the home are brought into close relationship; and through them also everyone in the state is given an opportunity to obtain the highest education possible at the smallest practical expense. They may be grouped as follows:

1. **Regular university studies,** which may be taken for credit toward a degree.
2. **Advanced courses** designed to help graduates and others already in professional or practical life to keep in touch with the advancement in science and other fields of knowledge.
3. **High school preparatory studies** for those for whom residence study is not available or practicable.
4. **Vocational courses** which supply knowledge and training in business, industrial, and professional fields.
5. **Elementary and grammar school studies** for adults who need such instruction for practical purposes.
6. **Review Courses.**

Over 400 courses are offered, some of which are listed below:

GENERAL
Botany
Chemistry
Comparative Literature
Education
English
Modern Languages
General Science
Geography
High School Subjects
History
Home Economics
Library Methods
Industrial Arts
Mathematics
Music
Pharmacy
Philosophy
Sociology

BUSINESS
Accounting
Advertising
Auditing
Bookkeeping
Bus. Management
Bus. Correspondence
Business Law
Cost Accounting
Economics
Elements of Money & Banking
Freehand Lettering
Income Tax
Retail Selling
Show-Card Writing

ENGINEERING
Aeronautics
Architectural
Automotive
Chemical
Civil
Concrete
Drafting
Electrical
Heating and Ventilating
Mathematics
Mechanical
Railroad
Structural
Surveying
Telephony

For detailed information, call at the University Extension Division, The University of Wisconsin, 623 West State Street, Milwaukee, Wisconsin, or telephone Marquette 7051.

Or write to the University Extension Division, the University of Wisconsin, Madison, Wisconsin.

UNIVERSITY OF WISCONSIN
UNIVERSITY EXTENSION DIVISION

DEPARTMENT OF EXTENSION TEACHING offers instruction as follows:

CORRESPONDENCE-STUDY: Courses for adults seeking instruction in elementary and vocational subjects as well as for those in candidacy for university degrees or for keeping abreast after graduation.

CLASS INSTRUCTION: In communities throughout the State where sufficient common interest and demand develop for the formation of such classes, conducted usually late afternoons, evenings, or Saturday mornings; classes meet for a double period once a week or oftener.

DEPARTMENT OF DEBATING AND PUBLIC DISCUSSION: Furnishes programs for women's clubs and other groups; package libraries; home reading courses; programs and guidance for debating clubs and parent-teacher associations; general information.

MEDICAL LIBRARY SERVICE: Lends books, reprints, and periodicals—current periodicals lent regularly; package libraries on special subjects.

DEPARTMENT OF PUBLIC SERVICE offers service to groups and individuals in Wisconsin through the following bureaus:

BUREAU OF LECTURES AND SHORT COURSES: Provides for lectures by faculty for community events and commencements; offers cost co-operative lyceum courses and short courses and institutes.

BUREAU OF VISUAL INSTRUCTION: Lends educational lantern slides and motion picture films to schools, community organizations, associations, and churches.

BUREAU OF ECONOMICS AND SOCIOLOGY: Collects information on social and economic life of Wisconsin; provides information, counsel, and service for groups and communities relative to their social and economic problems.

BUREAU OF DRAMATIC ACTIVITIES: Offers guidance and direction in the writing and production of plays, pageants, and home chautauquas. Field representative available.

BUREAU OF BUSINESS INFORMATION: (In co-operation with the School of Commerce.) Answers inquiries and issues bulletins on subjects of interest to the business men of the state.

(Information and bulletins sent free on request)

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1937-38

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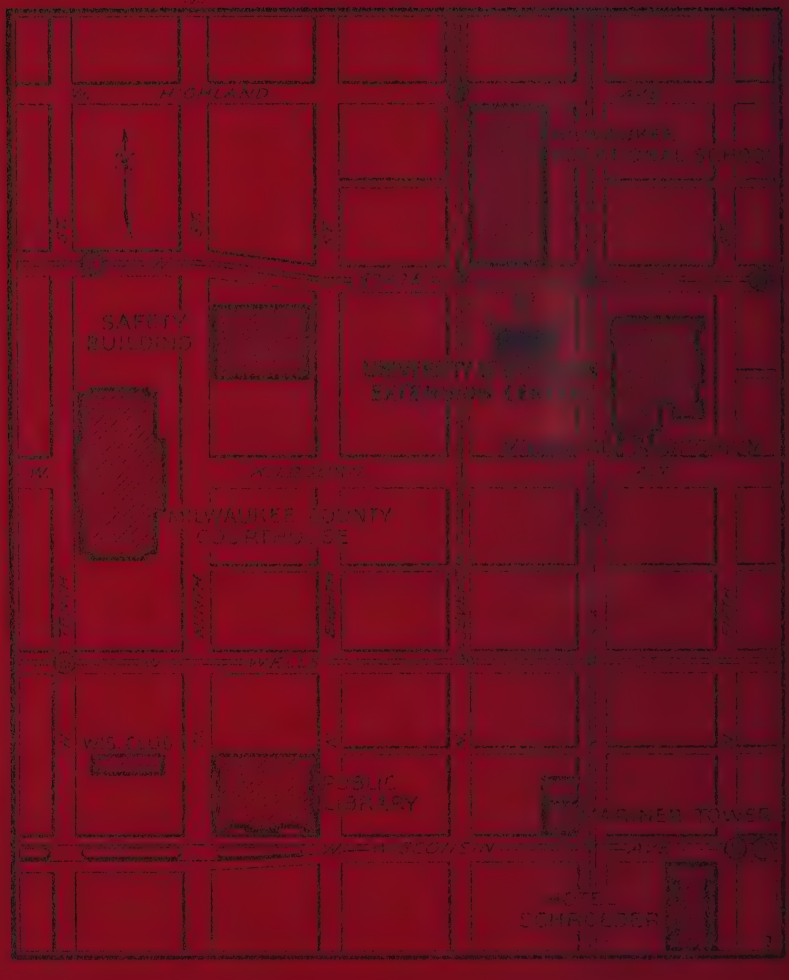
University Extension Division
623 West State Street Marquette 7051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CALENDAR

1937-38

DAY CLASSES

FIRST SEMESTER

September 14	Tuesday, 2 p.m.	Freshman meeting; attendance required
September 15, 16	Wednesday, Thursday 9-11 a.m.; 2-4 p.m.	Registration days
September 20	Monday	Instruction begins
September 25	Saturday, 9 a.m.	Condition examinations
September 25	Saturday evening	Faculty-student reception
October 2	Saturday, 2 p.m.	Foreign language attainment examinations
November 25-28 incl.		Thanksgiving recess
December 18 (noon)-January 2 incl.		Christmas recess
January 15	Saturday, 9 a.m.	Condition examinations
January 15	Saturday, 2 p.m.	Foreign language attainment examinations
January 24-29 incl.	Monday-Saturday	Final examinations

SECOND SEMESTER

February 3, 4	Thursday, Friday 9-11 a.m.; 2-4 p.m.	Registration days
February 7	Monday	Instruction begins
February 22	Tuesday	Washington's birthday; legal holiday
April 9 (noon)-April 17 incl.		Spring recess
April 30	Saturday, 9 a.m.	Condition examinations
May 14	Saturday, 2 p.m.	Foreign language attainment examinations
May 5, 6	Thursday, Friday (evenings)	Mathematics exhibit
May 30	Monday	Memorial Day: legal holiday
June 6-11 incl.	Monday-Saturday	Final examinations

EVENING CLASSES

FIRST SEMESTER

September 13-18 incl.	Monday-Saturday	Registration days
September 20	Monday	Instruction begins
October 2	Saturday evening	Faculty-student reception
November 25	Thursday	Thanksgiving Day: legal holiday
December 18-January 2 incl.		Christmas recess
January 24-28 incl.	Monday-Friday	Final examinations

SECOND SEMESTER

January 31-February 5 incl.	Monday-Saturday	Registration days
February 7	Monday	Instruction begins
May 30-June 3 incl.	Monday-Friday	Final examinations

UNIVERSITY EXTENSION CENTER, MILWAUKEE

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GENERAL INFORMATION

LOCATION

Classes are held in the University Extension building at 623 W. State Street, opposite the Milwaukee Vocational School and the City Auditorium. The twenty-five classrooms and lecture halls which this building affords, together with its library and six science laboratories, enable the Extension Division to offer a complete program of studies.

OPPORTUNITIES FOR WORK

Since this institution offers morning, afternoon, and evening classes, it is possible for students to arrange to take work for University credit at convenient hours. Students expecting to earn their way through college are allowed to carry a reduced program of studies upon the approval of the scholarship committee. Milwaukee, being the largest city in Wisconsin, offers a great variety of opportunities for high school graduates to come there from various parts of the State and find part time employment in many large industrial and business concerns.

REDUCED PROGRAMS

Students in Day Classes are expected to take the full program of the course elected. Applications for reduced programs are approved by the scholarship committee only when the student can show legitimate reasons for the reduction.

GUIDANCE AND COUNSELING

The University of Wisconsin Extension Center emphasizes individual attention to students. This work is carried on by the Guidance Staff. Each student is assigned to a counselor as soon as he enters. With his counselor he can discuss his academic and personal problems as they arise and work out a curriculum that best suits his needs. This is made possible by the varied types of work offered, which include courses in Business, Engineering, Letters and Science, and Liberal Education, and special courses in the Technical Institute.

The services of the Guidance Staff are available to high school graduates without cost during the month of August. Students and their parents are invited to arrange for an appointment during this period.

REGISTRATION

Registration consists of filling out the necessary blanks provided at the office and the payment of fees for the courses taken. **The student is not placed on the class roll until he has complied with this rule.**

For dates of registration, see calendar on page 3. The office is open from 8:00 a.m. to 5:00 p.m. and from 7:00 to 9:45 p.m. on all weekdays except Saturday, and from 8:30 a.m. to 12:00 noon on Saturday. During the registration period the office is open continuously from 8:00 a.m. to 9:00 p.m. on all weekdays except Saturday and on Saturday from 8:30 a.m. to 3:00 p.m.

FEES

A fee of five dollars ($5.00) a credit hour is charged for all university credit work in the Extension Division. Laboratory fees and textbooks are additional. The fee for non-credit courses is specified in the bulletins describing these courses.

All fees are payable at the time of registration. One dollar ($1.00) is charged for late registration in the day classes and in the evening classes.

DEFERRED PAYMENTS

In day classes arrangements may be made for the payment of fees in three installments. Under this plan one-third of the amount of tuition, all laboratory fees, and an extra charge of $3 must be paid at the time of registration.

Evening class fees amounting to more than $10 may be paid in two installments. One-half of the total amount plus an extra charge of $1 must be paid at the time of registration.

REFUNDS

Day Classes

Partial refunds to students withdrawing from the day classes are made upon the following basis if written notice is given at the time of withdrawal: within two weeks from the first day of instruction, 80% refund; within four weeks, 60%; within six weeks, 40%; within eight weeks, 20%; after eight weeks, no refund. The late registration fee and the additional fee for deferred payments are not refundable.

Evening Classes

All applications for refunds must be made in writing.

In cases where a class is discontinued or the meeting day of the class is changed after a student has registered, the entire amount of the fees paid will be refunded upon the written application of the student.

Applications for cash refunds not covered by the preceding paragraph must be made before noon of the third Saturday following the beginning of

the class; a registration fee of 20% will be retained from each class fee. The late registration fee and the additional fee for deferred payments are not refundable.

A student withdrawing who notifies the office in writing during the period from the fourth to the sixth week inclusive after the beginning of the class will receive a credit memorandum card covering a fraction of the fee paid, according to the following schedule:

Fourth Week	75%
Fifth Week	70%
Sixth Week	65%

This card is not transferable except to a member of the immediate family of the person to whom it is issued and may be applied on a future enrollment provided it is used within two years from the date of issue.

The business office of the Milwaukee Center may in unusual cases extend the period indicated above for the granting of credit cards in instances where the student withdrew before the end of the sixth week of school but failed, for some unavoidable reason, to make application for a credit refund until after the end of the six-week period.

ATTENDANCE

Day Classes

It is expected that every student will be present at all the meetings of the classes in which he is enrolled. Any student who at the date of the mid-semester examination in any course has been absent from more than five per cent of the total number of meetings to be held during that semester and who fails to pass said mid-semester examination may be required to drop the course with failure. Any student whose percentage of absences for any semester in any course exceeds ten per cent of the total number of meetings scheduled for that course may be excluded from the final examination and given a condition.

Absence from a recitation immediately preceding or following the Thanksgiving or Christmas or Spring Recess shall count as two ordinary absences.

Absence from a quiz section carries a grade of zero for the period covered by that quiz section unless the work is made up to the satisfaction of the instructor concerned.

Evening Classes

Students desiring University credit are not allowed more than two absences a semester in any two-credit course. Those having absences in excess of that number shall satisfy the instructor that the work has been made up by special examination or otherwise before credit is given. In certificate courses four absences are allowed. Absences in excess of this number are to be made up in a manner similar to the procedure as outlined above for credit courses.

All students who receive credit toward a degree or a certificate must take the final examination and make a minimum grade of 70 per cent for the course.

CHANGE OF STUDIES AND DROPPING STUDIES

Day Classes

A student who wishes to make a change in his schedule of studies must secure the written approval of his counselor and of the head of the department concerned.

A student who drops a subject without written permission secured in advance will receive a failure in that study and may be subject to further discipline by the faculty.

DEFICIENCIES

Failures

In general, a student who has failed in any required subject must remove the failure by repeating that subject in class **as soon as it is again offered** and securing a passing grade.

Conditions

The grade of condition is given to a student who has carried a subject throughout a semester with a passing average, but who, failing in his final examination, reduces his semester average to some numerical standing between 60 and 69. In order to remove a condition a student must pass a special examination during his next succeeding semester of residence or it becomes a failure. If, in a course involving both laboratory and classroom work, the condition has been incurred on account of unsatisfactory laboratory or report work, it may be removed by absolving such substantial requirements as the instructor in charge of the course may prescribe. The removal of this type of condition will take effect on the official date for the removal of conditions.

For dates for the removal of conditions, see calendar, page 3. Applications for these examinations must be made to the Recorder ten days before the date given.

STUDENT ACTIVITIES

All student activities, such as student dances, Spotlight plays, etc., must terminate by the middle of May.

Regulations

1. Students who are enrolled for University credit may be **members** of student organizations, subject to the regulations of such organizations.

2. Students who are enrolled for University credit may participate in extracurricular activities, subject to the following restrictions.
   a. Only students who are enrolled for nine or more University credits may participate in extracurricular activities designated as **"major"** and **"minor,"** except by special permission of the Committee on Student Activities.*

*A list of the major and minor activities will be found on the official bulletin board.

b. Students who enter the University on **probation** or who are placed on **probation** by the Committee on Scholarship may not participate in major or minor activities until such probation is removed. Students on probation may be pledged but not initiated by any fraternity or sorority.

c. Students who are eligible may not at any time carry more than **eight** points in major and minor activities. Every major office or function is to be counted as three points and every minor office or function as two points.

For regulations governing participation in forensic and athletic activities, see pages 11 and 13.

Badger Record

The Badger Record is a weekly newspaper containing news, feature articles, and editorials about school activities. It affords an opportunity for all interested students to do some work in journalistic writing, newspaper make-up, and advertising.

Civic and Activity Club (C.A.C.)

The Civic and Activity Club is an organized group of men and women students who meet twice a month to participate in programs of civic and social interest.

Co-ed Club

The Co-ed Club is the only organized girls' group open to all freshman and sophomore girls.

Discussion Groups

Small discussion groups meet weekly or biweekly to discuss questions of general interest.

Forensics

Students interested in applied public speaking may participate in inter-squad and intercollegiate after-dinner speaking, debate, discussion, extemporaneous speaking, and oratorical contests. Only students with better than average scholastic standing in courses making up a normal credit load are eligible for intercollegiate forensic activities.

Forestry Club

Membership is open to all Pre-Forestry students and to all other students interested in forestry. The purpose of the organization is to give students a knowledge of the field of forestry and to aid in conservation practices. Meetings are held twice each month. They may be either in the nature of special lectures or of field trips.

French Club

The French Club meets every two weeks. The business meetings and the programs are conducted in French to acquaint the student with French

conversation and French thought. Any student who has studied or is studying French is eligible for membership. One of the purposes of the Club is to build up a background that will enable the student to get more enjoyment from the classroom routine.

German Club

The German Club, which meets twice a month, aims to acquaint its student members with Germany and its people and with the achievements of Germany in the fields of art, science, and literature. In addition it furnishes supplementary practice in language work. Musical numbers, presentation of plays, recitations, short talks on cultural subjects, and singing of popular folk-songs make up the programs. Other meetings held during the year are of a purely social character intended to promote good fellowship. Some of the meetings are open to the public.

Greek Letter Societies

Social

The sororities, Phi Delta Delta and Tri Omega, and the fraternity, Gamma Kappa Phi, are local organizations.

Honorary

The Alpha Chapter of Sigma Epsilon Sigma, a branch of the Alpha Chapter of the University of Wisconsin, will be installed at the Milwaukee Center in the fall of 1937. All women having completed their freshman year with a scholastic average of 2.5 or more will be eligible.

Mathematics Club

The Mathematics Club is an organization of the students who are interested in mathematics. The club holds monthly meetings at which papers are presented by students and members of the faculty. A portion of each meeting is spent in playing mathematical games and in the solution of mathematical puzzles. The purpose of the club is to stimulate the interest of students in mathematics by discussing many interesting phases of the subject which cannot be taken up in the classroom, and by showing the fundamental relation of mathematics to the other sciences.

For information about the Euler prize, see page 15.

Mathematics Exhibit

During the second semester, the Mathematics Club has an evening meeting to which it invites all members of high school mathematics clubs in the city. All other students interested in mathematics are welcome. The members present a program consisting of several talks on various topics in mathematics. Also, there is an exhibit of mathematical models, instruments, drawings, and computing machines. Many of the drawings and models are made by the students during the school year. For date, see calendar on page 3.

Photo Club

The Photo Club is a group of ambitious amateur photographers organized under the auspices of the Department of Physics. The purpose of the organization is to improve photographic techniques and to promote an interest in pictorial photography. Meetings are held twice each month, the programs consisting of discussions and demonstrations of photographic processes. Membership is not limited to students. Anyone who is interested in photography may join the club. An annual exhibit of the work of the club is held in the spring.

Polish Club

Membership is open to any student who is studying the Polish language or to any student of Polish parentage. It is the purpose of the club to give students an opportunity to study and discuss literature, to sing folksongs, and to carry on a correspondence with college students in Poland who are studying the English language. The meetings are conducted on a social basis and are held once a month.

Spanish Club

All students now studying Spanish as well as others who have studied Spanish in the past are eligible to membership. The members plan to hold monthly meetings with carefully prepared programs. Each program consists of two distinct parts: first, a formal program of special numbers such as talks, reports, music, dancing, dialogues or plays; second, a social program with informal group songs, games, and contests.

Spotlight Club

Students desiring experience in acting, producing, costuming, or writing plays are welcome in the Spotlight Club. A short dramatic program is given at each of the biweekly meetings.

Student Council

Four representatives from the freshman class and four representatives from the sophomore class, elected at convocations, serve as the Council.

The Student Council aids directly in the administration of student affairs. It is the official organization for student expression in matters pertaining to the welfare of the school.

The Student Council acts as co-ordinator of extracurricular activities and provides supervision of the library and recreation and study rooms. In fulfilling its purpose of promoting the best interests of the study body, it is a clearing house for student problems.

PHYSICAL ACTIVITY REQUIREMENT

Regulations Concerning Physical Activities for Men.

A. Physical activity requirement.[1]

The physical activity requirement may be met in one of two ways:

(1) Three hours a week of physical education work at a recognized gymnasium.

[1] Students who transfer to the University at Madison with at least sophomore standing are automatically exempt from the physical activity requirement.

(2) Participation in major sports[1] at the Milwaukee Center to the extent of at least 102 hours.

B. Participation in intercollegiate activities.

The requirements for membership on an intercollegiate team are based upon the following regulations:

(1) Enrollment for university credit.
(2) No disciplinary probation.
(3) No unsatisfied failure, condition, or incomplete.
(4) Consent of the Coach.

Students expecting to receive physical education credit must enroll with the Athletic Committee at the beginning of the semester.

Regulations Concerning Physical Activities for Women.

The physical activity requirement may be met in one of two ways:

(1) Two semesters of physical education work at an approved gymnasium.

(2) Participation in certain sports under an approved director.

Students expecting physical education credit must enroll with the Adviser to Women at the beginning of each semester.

SCHOLARSHIP AWARDS

The Gamma Kappa Phi Fraternity each year awards a cup on which is engraved the name of the student who is selected by the faculty as having achieved a superior record in general scholarship and as having shown school loyalty and fraternal spirit. In addition, a scholarship emblem is presented to the winner. Students competing for this honor must have taken at least three semesters' work at this institution.

A similar cup is awarded, through the courtesy of Mr. George Brumder, for superior work in German. The candidates competing for this award must have studied German at the Extension Division for at least two semesters and must have obtained not less than 28 credits in that year, with a minimum average of C.

Sophomore Honors and Sophomore High Honors are awarded at the close of the year to those students who have made records similar to those required for obtaining the same honors at the University of Wisconsin.

A special award is granted each year to the sophomore who has the highest number of grade points per credit for two full years' work at the Extension Division.

Freshman Honors are awarded each year to three students having the highest number of grade points per credit for that year. The standing of the various students is computed upon the basis of their first semester grades and the mid-semester grades of the second semester. A student eligible for this award shall have carried a full schedule of work, that is to say, shall have completed a minimum of 28 credits of work by the end of the semester in which the award is made.

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[1] A complete list of the available sports will be posted on the official bulletin board.

THE HENRY HARNISCHFEGER AWARD

Beginning with the academic year 1929-30, and extending over a period of ten consecutive years, an annual prize of fifty dollars is provided by the late Mr. Henry Harnischfeger of Milwaukee and his heirs for the best German essays. Candidates must have studied German in the high schools of Milwaukee (suburbs included), for at least four semesters. The prizes are awarded by a jury, consisting of three members, to the students writing the best German essays on an assigned topic. The date of the essay contest, which is held at the University Extension Center, 623 West State Street, is communicated to the high school principals and their German staffs two weeks in advance.

THE EULER PRIZE IN MATHEMATICS

A prize is awarded annually at the commencement exercises in June for the best paper presented by a student before the Mathematics Club on a subject chosen by the student and approved by the Department of Mathematics. The prize is known as the Euler Prize. If, in the opinion of the mathematics faculty, no paper is presented before the Mathematics Club which merits the awarding of the prize, no prize is awarded.

THE LIBRARY

The library contains approximately 8,500 books. It receives, currently, 90 periodicals of both general and technical interest.

Books may be drawn for home use for a two-week period, with the exception of reference books and books reserved by the faculty for supplementary reading. Reserve books are available for a two-hour period.

Library hours

8:30 a.m. -9:30 p.m. Monday—Friday
9:00 a.m. -12:00 a.m. Saturday

The library is closed during the summer.

LECTURE BUREAU

The University Extension Division in Madison strives to make its services readily available to societies, organizations, study groups, and the public. It maintains a special bureau through which arrangements may be made for lectures by members of its faculty. These lectures include discussions and demonstrations in many fields: astronomy, business, chemistry, child guidance, linguistics, literature, mathematics, physics, radio, travel, zoology.

Persons desiring speakers for clubs, assemblies, business or technical gatherings, or study groups should get in touch with the Bureau. The fee for the lecture may be arranged with the Bureau. Information regarding this service may be obtained by writing the Lecture Bureau, University Extension Division, Madison, Wisconsin.

THE CLINIC FOR THE CORRECTION OF SPEECH DEFECTS

For information, consult Dr. Lyman S. Judson.

UNIVERSITY CREDIT COURSES

ADMISSION

REQUIREMENTS FOR ADMISSION BY CERTIFICATE

Sixteen units are the fundamental requirement for regular admission to any college or course in the University.

I. The usual means of gaining admission to the university is by presenting a certificate of graduation from an accredited four-year or an accredited senior-high school showing satisfaction of the underwritten requirements and bearing the principal's recommendation of the candidate's fitness for college. Graduates of four-year non-accredited schools in Wisconsin who have satisfied the full requirements for admission to the University may be admitted on probation, without examination, upon recommendation of the principal.

1. Definitions. A *unit* represents a norm of five class-periods per week in one field of study for a school year of at least 36 weeks. Two laboratory periods in a science or other subject are considered equivalent to one class period. In subjects not usually taught throughout an entire school year, a unit may be constructed by adding the respective time values of two related subjects.

Except in foreign language (see below), a *major* consists of three or more units in one field of study and a *minor* consists of two units in one field of study.

"Unrestricted" admission to the University is admission which opens to the student all colleges, courses, and fields of study to which freshmen are eligible and insures full freedom of choice among all the college majors and fields of specialization. "Restricted" admission opens to the student such colleges, courses, and fields of specialization as do not require high-school mathematics as background. It does not give admission to the College of Agriculture or the College of Engineering or the Course in Chemistry, and does not permit the student to major or specialize in chemistry, commerce, economics, mathematics, pharmacy, pre-medicine, philosophy, political science, psychology, or sociology, or in any of the other natural sciences including physical geography and geology, or to graduate from the School of Education with a major or minor in any of these fields.

2. Sixteen units are required of a graduate of a regular four-year high school for admission as a regular student to any college or course open to freshmen.

3. Admission of such graduate shall be based upon: (a) the completion of two majors and two minors selected from four of the fields in

Group A (below); one of these majors shall be English and Speech (unless the candidate offers a minor in foreign language, in which case a minor in English and Speech will suffice); and for "unrestricted" admission one major or minor shall be mathematics, *i.e.*, one unit of algebra and one unit of plane geometry, with an additional half-unit of algebra in the case of those who seek unqualified admission to the College of Engineering; and (b) the completion of the additional units necessary to make a total of sixteen units selected from Group A and Group B (below), with the provision that not more than six of the sixteen units may be presented from Group B. Pupils planning early in their high-school career to enter the College of Letters and Science or the College of Engineering are advised to present all sixteen units from Group A. Until further action by Faculty and Regents not more than two units in advanced applied music or, alternatively, in art will be accepted under Group A. (Broadly speaking advanced applied music may be provisionally defined as applied music based upon two years of preparation in band or orchestra, or equivalent preparation in chorus. The units in art shall be based upon adequate preparation in freehand drawing in the grades or an equivalent.)

4. Graduates of high schools which maintain a senior-high-school division shall present twelve units from this division to include: (a) one major and two minors selected from three of the fields in Group A or four minors selected from four of the fields in Group A; one major or minor shall be in English and Speech, and for "unrestricted" admission one major or minor shall be mathematics (as described above) unless, before entering the senior-high-school, the entrant has completed one of the two units in mathematics specified in the preceding sub-section, in which case the completion of the second unit will suffice. (b) The remaining units shall be selected from Group A and Group B (See advice in preceding sub-section.)

Fields of Study

Group A

English and Speech	Mathematics
Foreign Language	Natural Sciences
History and the Social Sciences	Advanced Applied Music or Art

Group B

Agriculture	Industrial Arts
Commercial Subjects	Mechanical Drawing
Home Economics	Optional (2 units)

5. The foreign languages accepted for admission are French, German, Greek, Hebrew, Italian, Latin, Norse, Polish, and Spanish. If foreign language is offered under Group A, it must consist of at least a minor in one language. Three or more units in one foreign language or two units in each of two foreign languages shall constitute a major. A single unit of foreign language (i.e., one unaccompanied by a foreign-language minor) may be offered as an optional subject under Group B. (Four units in one

foreign language are preferable to two units in each of two foreign languages.)

6. "Restricted" standing may at any time at the option of the student be changed to "unrestricted" standing by the mastery, subsequent to high-school graduation, of the content of high-school algebra and plane geometry by private study, tutoring, or correspondence study. The University will not provide residence instruction in this preparatory work.

II. Graduates of Wisconsin high schools need not meet the above requirements if, on the combined basis of rank in graduating class and aptitude and achievement tests satisfactory to the University, they stand in the upper twenty-five per cent of the average freshman class entering the University and are recommended for college by the high-school principal; but their admission will necessarily be "restricted" unless their preparation includes the two units in mathematics. This does not apply to candidates for admission who have graduated from schools outside the state of Wisconsin.

OTHER METHODS OF ADMISSION

For information about admission on the adult special basis and admission upon examination apply to the Recorder, University Extension Division, Milwaukee.

UNDERGRADUATE CREDIT

The total number of credits that may be earned in the Extension Division combining instruction in day classes, evening classes, and correspondence can not total more than the equivalent of two years' credit in any curriculum.

Graduates of junior colleges or those who have finished two years of work at a four-year college are permitted to elect suitable courses of junior rank if they are offered at the Milwaukee Center. Such students may elect freshman or sophomore work if the requirements for the degree they seek include such work. The nature of this work will be determined by a committee of the faculty of the Milwaukee Center, and the amount is not to exceed two year-courses.

All candidates for degrees must expect to take their senior year in residence. The minimum residence requirement is 30 credits and 30 grade points, to be earned in at least two semesters at Madison (or six summer sessions, in no one of which may less than four credits be carried). All the requirements of the major subject must be met, including at least 15 credits and 15 grade points in advanced work (in some departments 20) in residence. If application is made in advance, very exceptional cases may be given special consideration by the dean or the executive committee of the College of Letters and Science.

Credits and Grade Points

In order to receive a degree the student must have not only the number of credits required in the course which he is pursuing, but his studies must

reach a certain average of excellence. This standard is fixed by the grade-point system, which requires for graduation from any course as many points as credits. The following table shows the University scale of grading, together with the number of points per credit for each grade:

Grade	Percentage Equivalent	Points per Credit
A (Excellent)	93-100	3
B (Good)	85- 92	2
C (Fair)	77- 84	1
D (Poor)	70- 76	0
Condition	60- 69	0
Failure	Below 60	0

A student in the general courses in Letters and Science who has received a grade of **B** in **each** subject of the preceding semester may take not to exceed 18 credits.

UNIVERSITY COURSES OF THE FRESHMAN AND SOPHOMORE YEARS

The University Extension Division offers freshman and sophomore programs of study in the following courses:

Chemistry
Engineering
Letters and Science
Pre-commerce
Pre-education
Pre-journalism
Pre-law
Pre-medicine
Pre-nursing
Social Work

All of these courses are approved by the respective residence departments at Madison and carry full credit toward a university degree.

Students who plan to take

Agriculture
Art Education
Home Economics
Library Course
Music
Pharmacy
Physical Education

should consult the recorder about adjustment of programs.

Students who expect to transfer to the School of Education are advised to adapt the requirements of the first two years of one of the General Courses to the requirements as stated on pages 22 and 23.

LETTERS AND SCIENCE CURRICULA

Recommended Sequences for Freshman and Sophomore Years

(For complete information about requirements, see bulletin of College of Letters and Science)

1. B.A. General Course (includes foreign language)

Freshman

		Credits per semester
English 1a-1b		3
Foreign language		3-4
Mathematics	Two of these are required, at least one to be taken in the freshman year.	3-4
Science		5
History		3
Physical activity requirement		.
		14-16

Two foreign languages may be elected if desired. Mechanical drawing (3 credits) may be elected if the students wishes to take only one study from the mathematics-science-history group in the freshman year.

Sophomore

	Credits per semester
English 30a-30b	3
or 33a-33b	2
Foreign language (if requirement has not been met)	3-4
Electives	?
Freshman requirements (if not met the first year)	?
	14-16

2. Ph.B. General Course (without foreign language requirement).

Freshman

		Credits per semester
English 1a-1b		3
Science	One or both of these or two sciences	5
Mathematics		3-4
Mathematics	Two of these are required, at least one to be taken in the freshman year.	3-4
History		3
Foreign lang.		3-4
Physical activity requirement		.
		14-16

Mechanical drawing (3 credits) may be elected in place of one subject in either of the groups specified above, provided the student takes the second subject in his sophomore year.

Sophomore

The study list for the sophomore year must include English 2, intermediate composition, two credits each semester, unless the student has passed an intermediate knowledge examination, or has completed successfully one year of foreign language in college. The study list must also include whatever subjects are necessary in order to complete the science-mathematics option and the history option commenced in the freshman year. If the philosophy and psychology option is chosen, work on it should commence during the sophomore year. In the event the foreign-language option has been met by examination, the student should have about twelve credits of free electives each semester of this year.

3. Chemistry Course[1] (Leading to B.S. degree)

Freshman

	Credits per semester
English 1a-1b	3
Chemistry 1a-1b and 3	5-6
German or French	3-4
Mathematics	3-4
Physical activity requirement	.
	16-17

Sophomore

	Credits per semester
Chemistry 11a-11b	5
German or French	3-4
Physics 1a-1b	5
Mathematics 5a-5b	3
	16-17

4. (a)Pre-commerce Course (leading to B.A. degree)

Freshman

	Credits per semester
English 1a-1b	3
Foreign language	3-4
Mathematics[2]	4
Science 5 credits or	
History 3 or 5 credits	3-5
Physical activity requirement	.
	14-16

[1] Admission to the junior year in the Chemistry Course is restricted to those students who have a grade-point average of 1.5 or better for courses in chemistry, mathematics, and physics.
[2] Including Theory of Investment (Math. 7).

Sophomore

	Credits per semester
English 30a-30b	3
or 33a-33b	2
Foreign language	3-4
Economics 1a	4
Accounting (Econ. 8-9)	3-4
	15-16

(b) Pre-commerce Course (non-language, leading to Ph.B. degree)

Freshman

	Credits per semester
English 1a-1b	3
Mathematics[1]	4-3
Science	5 or 10
(History)	(3)
Physical activity requirement	.
	14-16

Sophomore

	Credits per semester
English 2a-2b[2]	2
Economics 1a	4
(History)	(2-3)
Accounting (Econ. 8-9)	3-4
Elective	?
	14-16

5. Pre-education Course (leading to B.S. degree in education).

Students who expect to transfer to the School of Education should select one of the following sequences:

Sequence I

A. No foreign language required

B. Required:

English composition, 10 credits (English 1 and 2)
History, 10 credits†
Social sciences, 6 credits‡
Mathematics or philosophy, 10 credits**
Natural science, 20 credits in regular year courses§

[1] Including Theory of Investment (Math. 7).
[2] Not required if foreign language option for Ph.B. degree has been absolved.
† Must include a year course in European (Course 2 or 5) or American history.
‡ Political Science 7 (3 credits), Geography 6 (3 credits), and economics or sociology (3 credits) are recommended.
** Philosophy 21 (3 credits) and Philosophy 11 (3 credits) are required.
§ Must include at least one semester course in the biological sciences, zoology being strongly recommended. It is recommended that the rest of the science requirement be met in the physical (non-biological) sciences.

Sequence II

A. Required:
Intermediate knowledge of one language

B. Required:
English composition, 6 credits; English literature, 4-6 credits
History, 6 credits†
Social sciences, 6 credits‡
Mathematics, 8 credits, or philosophy, 6 credits**
Natural science, 10 credits in elementary survey courses or in regular year courses or in both§

Sequence III

A. Required:
Intermediate knowledge of one language

B. No English literature required
Required:
English composition, 6 credits
History, 6 or 10 credits†
Social sciences, 6 credits‡
Mathematics, 10 or 8 credits **or**
Philosophy, 10 or 6 credits**
Natural science, 20 credits in regular year courses§

Sequence IV

A. Required:
Proficiency in one foreign language, **or**
Intermediate knowledge in two foreign languages, **or**
Intermediate knowledge in one foreign language plus 10 credits in literature courses in that language

B. Required:
English composition, 6 credits; English literature, 4-6 credits

Two of the following:

(a) history, 6 credits†; and social sciences, 6 credits‡

(b) mathematics, 8 credits

(c) natural sciences, 10 credits in elementary survey courses or in regular year courses or in both§

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† Must include a year course in European (Course 2 or 5) or American history.

‡ Political Science 7 (3 credits), geography 6 (3 credits), and economics or sociology (3 credits) are recommended.

** If philosophy is chosen, Philosophy 21 (3 credits) and Philosophy 11 (3 credits) are required.

§ Must include at least one semester course in the biological sciences, zoology being strongly recommended. It is recommended that the rest of the science requirement be met in the physical (non-biological) sciences.

6. Pre-journalism Course (leading to B.A. degree)

Freshman

	Credits per semester
Journalism 1a-1b	1
English 1a-1b	3
Foreign language (one or two)	3-8
History 1a-1b, 2a-2b, 5a-5b, or 10a-10b	3
Science or Mathematics	5-4
Physical activity requirement	
	15-16

Sophomore

	Credits per semester
English 30a-30b	3
Economics 1a-1b	4
Electives Recommended: Political Science 7; History 4; Psychology[1]	8-9
	15-16

7. Pre-legal Course

Same as either Curriculum 1 or 2 above.

Note: Three years of undergraduate work in Engineering is accepted for admission to the Law School, provided it includes 6 credits in Social Sciences.

8. (a) Premedical Course (leading to B.A. degree)[1]

Freshman

First Semester	Credits	Second Semester	Credits
English 1a	3	English 1b	3
Chemistry 1a	5	Chemistry 1b	5
French or German	3-4	French or German	3-4
History or Mathematics	3-4	History or Mathematics	3-4
Physical activity requirement		Physical activity requirement	
	15-16		15-16

Sophomore

English 30a or 33a	3-2	English 30b or 33b	3-2
Chemistry 20a, 21a	4	Chemistry 20b, 21b	4
French or German	3-4	French or German	3-4
Zoology 1—Animal Biology	5	Zoology 104	5
	15-16		15-16

[1] Premedical students entering the second semester substitute Zoology 1 (Animal Biology) for Chemistry 1a in their curriculum.

(b) Premedical Course (leading to B.S. degree)[1]

Freshman

First Semester	Credits	Second Semester	Credits
English 1a	3	English 1b	3
Chemistry 1a	5	Chemistry 1b	5
French or German	3-4	French or German	3-4
Mathematics	4-3	Mathematics	4-3
Physical activity requirement		Physical activity requirement	
	15-16		15-16

Sophomore

Chemistry 20a, 21a	4	Chemistry 20b, 21b	4
French or German	3-4	French or German	3-4
Zoology 1—Animal Biology	5	Zoology 104	5
Electives	3	Electives	3
	15-16		15-16

PRE-FORESTRY PROGRAM

The subjects listed below correspond closely to the requirements of the forestry courses offered by institutions in other states. Since many schools require attendance at a camp during the summer following the sophomore year, students are advised to consult at an early date the institution to which they plan to transfer.

Freshman

First Semester	Credits	Second Semester	Credits
English 1a	3	English 1b	3
Mathematics	4	Mathematics	4
Botany 1	5	Botany 2	5
Topographic Engr. 1	2	Topographic Engr. 2	2
	14		14

Sophomore

Economics 1a	4	Economics 1b†	4
Chemistry 2a	4	Chemistry 2b	4
Topographic Engr. 3	3	Zoology 1	5
Elective	4-5	Drawing 1	3
	15-16		16

Desirable electives include:

Physics 1a, 1b
Geography
English 30 or 33
Speech 1, 2, 8

[1] Premedical students entering the second semester substitute Zoology 1 (Animal Biology) for Chemistry 1a in their curriculum.

†A course in history or social science may be substituted for Economics 1b.

ENGINEERING CURRICULA

Leading to the Degree of Bachelor of Science

Freshman Lectures

A course of lectures is provided for freshman engineers. A few of these lectures will be on subjects of general interest. For the most part, however, the lectures will give the student an idea of some of the problems of the engineer in practice. This series of lectures should help him to realize that the various courses of study are each a necessary part of his training.

Some of the lectures will be given by members of the University staff; others by prominent engineers and by representatives of industry.

All freshman engineers are **required** to attend these lectures.

Civil Enginering

Freshman

First Semester

	Credits
Math. 51.—Elementary analysis	5
Draw. 1—Elements of drawing	3
Chem. 2a—General chemistry	4
Engl. 1a—Freshman English	3
Top. Engr. 1—Elementary surveying	2
Freshman lectures	0
Physical activity requirement	0
	17

Second Semester

	Credits
Math. 52—Elementary analysis	5
Draw. 2—Elements of drawing	3
Chem. 2b—General chemistry	4
Engl. 1b—Freshman English	3
Top. Engr. 2—Elementary surveying	2
Freshman lectures	0
Physical activity requirement	0
	17

Sophomore

	Credits
Math. 54—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5
Top. Engr. 3—Land surveying	3
Ry. Engr. 1—Railway curves	2
Ry. Engr. 2—Route surveying	3
	17

	Credits
Math. 55—Integral calculus	4
Physics 52—Lectures and lab. practice	5
Mechanics 1, 2—Statics, dynamics	5
Top. Engr. 104—Advanced surveying and mapping	3
	17

Mechanical Engineering

Freshman

First Semester

	Credits
Math. 51—Elementary analysis	5
Engl. 1a—Freshman English	3
Draw. 1—Elements of drawing	3
Chem. 2a—General chemistry	4
Non-professional elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Second Semester

	Credits
Math. 52—Elementary analysis	5
Engl. 1b—Freshman English	3
Draw. 2—Elements of drawing	3
Chem. 2b—General chemistry	4
Non-professional elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Sophomore

	Credits
Math. 54—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5
Mach. Des. 1—Mechanism	4
Draw. 3—Descriptive geometry	3
Non-professional elective	2
	18

	Credits
Math. 55—Integral calculus	4
Physics 52—Lectures and lab. practice	5
Mach. Des. 2—Design practice	1
Mechanics 1, 2—Statics, dynamics	5
Non-professional elective	2
	17

Electrical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Speech 8—Extempore speaking	2	Non-professional elective	2
Freshman lectures	0	Freshman lectures	0
Physical activity requirement	0	Physical activity requirement	0
	17		17

Sophomore

First Semester	Credits	Second Semester	Credits
Math. 54—Differential and integral calculus	4	Math. 55—Integral calculus	4
Physics 51—Lectures and lab. practice	5	Physics 52—Lectures and lab. practice	5
Draw. 3—Descriptive geometry	3	Mechanics 1, 2—Statics, dynamics	5
Econ. 1a—Elements of economics	4	Top. Engr. 108 (elective)	3
Elective	2-4		17
	18-20		

Chemical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Elective	2	Elective	2
Freshman lectures	0	Freshman lectures	0
Physical activity requirement	0	Physical activity requirement	0
	17		17

Sophomore

Credits	Credits
Math. 54—Differential and integral calculus 4	Math. 55—Integral calculus 4
Chem. 14—Quantitative analysis 5	Elective 4
Physics 51—Lectures and lab. practice 5	Physics 52—Lectures and lab. practice 5
Mach. Des. 1—Mechanism 4	Mechanics 1, 2—Statics, dynamics 5
18	18

Mining Engineering, Metallurgical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Elective	2	Top. Engr. 108—Short course in surveying	3
Freshman lectures	0	Freshman lectures	0
Physical activity requirement	0	Physical activity requirement	0
	17		18

Students who wish to complete the chemical engineering, mining engineering, or metallurgical engineering courses in four years are advised to transfer to the College of Engineering at Madison at the beginning of the sophomore year.

TWO-YEAR DAY COURSE IN BUILDING DESIGN AND CONSTRUCTION

This specialized, intensive, two-year course gives training for positions connected with the design and construction of buildings. It is of particular interest to men who wish to become building inspectors, construction superintendents, structural or architectural draftsmen, or structural designers. The training given in this course will qualify the student for positions of substantial responsibility after a little practical experience. This is especially true if the student secures part-time employment along construction lines while attending school. This experience will be of great value to him not only in securing a position after completing the course but also in getting a better understanding of the application of theory to practice. The prerequisite for entrance to this course is high school graduation or its substantial equivalent. The requirements of the course are exacting and strenuous. Each applicant for admission is judged solely on his ability to carry the work and to profit by it.

CERTIFICATES

University of Wisconsin Extension Division certificates are issued to those who have successfully completed this course of study. These certificates are recognized in business and industry and by the public at large as standing for a very definite attainment.

FEES

The cost of this course is $75 a semester. An additional laboratory fee of $2.25 is charged for the course in surveying and $1.00 for Drawing 1. Part-time work may be taken. For information on deferred payments, see page 8.

LIST OF STUDIES

First Year

First Semester		Second Semester	
Mathematics 51	5	Mathematics 52	5
Mechanics 402	4	Strength of Materials 412	4
Drawing 1	6	Structural Drafting 413	6
Concrete Work 407	2	Estimating 414	2
English 1a	3	English 1b	3
	20		20

Second Year

First Semester		Second Semester	
Structures 424	7½	Reinforced Concrete 420	4
Steel Buildings 421	7½	Reinforced Concrete 430	4
Estimating 422	2	Contracts and Specifications 431	1
Foundations 423	1	Roof Truss Design 432	6
Materials of Construction 415	1	Reports 433	1
Construction Plant 425	1	Surveying 410	3
	20	Inspection Trips 438	1
			20

EVENING CERTIFICATE COURSES

BUSINESS

The completion of a well-rounded program of study is of much greater benefit to the student of Business than the taking of separate courses at random. Realizing this, the University of Wisconsin, through the Extension Division, will give a special certificate to young men and women who satisfactorily complete a series of related courses in any one of six special fields. The certificate may be earned in Accounting, in Marketing and Advertising, in Finance and Credit, in Industrial Management, in General Business. or in Secretarial Work. For certificate courses in Real Estate, see page 31.

In order to secure a certificate, a student must have completed satisfactorily twenty-four semester hours (ordinarily twelve courses) in one of the six special fields in which certificates are granted, including all the required courses and certain elective courses. **No course is completed unless a final examination is taken.** The special requirements for each group are listed below.

To complete the requirements for a certificate in three years, it will be necessary, ordinarily, for the student to attend classes on an average of two evenings a week, but he may, if he wishes, extend the time over a longer period of years. A student who is interested in taking a program of courses in preparation for the certificate should consult a member of the business department, who will be his faculty adviser.

Students who have had courses beyond high school should submit their records at an early date for evaluation of credits which can be applied toward a certificate.

The following lists of subjects show which courses are required and which courses may be elected in each of the six certificate groups. Each required course is indicated by a dagger (†). In addition to the required courses the student must elect, with the approval of his faculty adviser, enough courses to bring his total up to twenty-four semester hours. With the approval of a faculty adviser, courses not listed in the groups below may be taken as electives.

Certificate Course in General Business

†Business Principles
Business English or English 1a
English 1b
†Business Correspondence
†Accounting 1
†Accounting 2
Accounting 3
Accounting 4
Business Economics 355a and 355b
Business Law
  †101 Contracts
  102 Negotiable Instruments
  103 Agency and Corporations
  104 Property and Bankruptcy
Business Statistics
Business Psychology
Factory Management
Labor Problems
Personnel Management
†Marketing Practice
Advertising Procedure
Advertising Campaigns
Salesmanship
Public Speaking
Banking
†Business Finance
Investments
Security Analysis (Investments)
Fundamentals of Real Estate Practice
Real Estate Financing

Certificate Course in Accounting

Business Principles
†Accounting 1
†Accounting 2
Business English or English 1a
English 1b
Business Correspondence
†Accounting 3
†Accounting 4
†Auditing 5a
†Auditing 5b
†Cost Accounting 9a
Cost Accounting 9b
C. P. A. Review 135
Income Taxation 402a and 402b
Business Economics 355a and 355b
Business Law
  †101 Contracts
  †102 Negotiable Instruments **or**
  †103 Agency and Corporations
  104 Property and Bankruptcy
Banking
Business Finance
Analysis of Financial Statements
Advanced Accounting Problems 11
Governmental Accounting
Investments
Security Analysis (Investments)

One who intends to enter public accounting work will need to take more than the twenty-four semester hours which are required for this certificate. His faculty adviser will gladly make suggestions for further study.

Certificate Course in Marketing and Advertising

†Business Principles
Business English or English 1a
English 1b
†Business Correspondence
†Marketing Practice
Business Psychology
Business Economics 355a and 355b
†Advertising Procedure
†Advertising Campaigns
Retail Advertising
Accounting 1 and 2
Business Statistics
Banking
Business Finance
Investments
Security Analysis (Investments)
Credits and Collections
Business Law
  †101 Contracts
  102 Negotiable Instruments
  103 Agency and Corporations
  104 Property and Bankruptcy
†Salesmanship
Sales Management
Public Speaking
Retail Store Management
Accounting for Executives
Real Estate Selling

Certificate Course in Finance and Credit

†Business Principles
†Accounting 1
†Accounting 2
Business Economics 355a and 355b
Business English or English 1a
English 1b
Business Correspondence
†Credits and Collections
†Business Finance
†Banking
†Analysis of Financial Statements
Business Law
  101 Contracts
  †102 Negotiable Instruments
  103 Agency and Corporations
  104 Property and Bankruptcy
†Investments
†Security Analysis (Investments)
Real Estate Financing
Life Insurance Fundamentals
Property Insurance

Certificate Course in Industrial Management

†Business Principles
†Accounting 1
†Accounting 2
†Cost Accounting 9a
†Cost Accounting 9b
Business English or English 1a
English 1b
Business Correspondence
Business Economics 355a and 355b
Unemployment Compensation Act
Business Psychology
Labor Problems
†Personnel Management
Business Law
  101 Contracts
  102 Negotiable Instruments
  103 Agency and Corporations
  104 Property and Bankruptcy
†Factory Management
Public Speaking
Business Finance
Time and Motion Study

Certificate Course in Secretarial Work

†Business Principles
†Business English or English 1a
English 1b
†Business Correspondence
†Business Psychology
†Accounting 1
Accounting 2
†Secretarial Training 714
†Secretarial Training 715
Business Economics 355a and 355b
Business Law
  101 Contracts
  102 Negotiable Instruments
Public Speaking

Certificate Course in Secretarial Work (continued)

Marketing Practice
Advertising Procedure
Salesmanship
Banking
Business Finance
††Electives

††Those students who know definitely in what fields they are preparing to do secretarial work should go beyond the subjects listed on these pages and choose electives from business courses in the field selected such as Advertising, Accounting, Finance, or Real Estate. This program is also intended to meet the cultural needs of the students who enroll in it. Students may, therefore, choose electives in such fields as English Literature, Modern Language, History, Psychology, and the Social Sciences.

Certificate Courses in Real Estate

The Milwaukee Real Estate Board will issue an official certificate to anyone who is certified by the University Extension Division as having satisfactorily completed four of the Real Estate courses listed below. To students who satisfactorily complete eight of the Real Estate courses listed below will be issued a University Extension Division certificate endorsed by the National Association of Real Estate Boards.

Real Estate Courses

Fundamentals of Real Estate Practice
Real Property Law and Conveyancing
Real Estate Financing
Real Estate Economics
Real Estate Selling
Real Estate Appraisals
Property Management
City Planning and Zoning
Property Insurance

Certificate Courses in Insurance

The University Extension Division is cooperating with the American College of Life Underwriters and the Life Office Management Association Institute in giving courses leading to the designations, certificates, and degrees offered by them.

C. L. U.

The designation Chartered Life Underwriter (C. L. U.) will be awarded to life insurance underwriters who meet the eligibility requirements of age, character, education, and experience, and who satisfactorily pass a series of examinations in the following subjects:

I. Life Insurance Fundamentals
   a. Economics of Life Insurance
   b. Principles and Practices

II. Life Insurance Salesmanship
   a. Principles of Salesmanship
   b. Psychology of Life Insurance Salesmanship

III. General Education (including English)
   a. Economic Problems
   b. Government
   c. Sociology

IV. Laws, Trusts, and Taxes
   a. General Commercial Law
   b. Wills, Trusts, and Estates
   c. Taxation of Insurance

V. Finance
   a. Corporation Finance
   b. Banking and Credit
   c. Investments

L. O. M. A.

Home office employees of life insurance companies will receive a certificate from the Life Office Management Association upon satisfactorily completing the four examinations in Course Number I: Principles of Life Insurance. Those satisfactorily completing Course Number I and the six examinations in Course Number II, Advanced Life Insurance, will become Associates of the Life Office Management Association Institute.

For a description of the courses offered in preparation for the C. L. U. and L. O. M. A. examinations, see pages 53 and 54 of the 1936-38 catalog, or call at the General Office of the University Extension Division for the bulletin which describes the work more fully.

INSURANCE INSTITUTE OF AMERICA

The Extension Division is co-operating with the Milwaukee Board of Fire Underwriters and the Insurance Institute of America in presenting a series of courses that will constitute a well-rounded program of insurance training. During 1937-38 a course in Inland Marine Insurance is offered to prepare students to take the Insurance Institute's examination on Part 1 of the Fire Branch.

ENGINEERING

COURSES FOR BUILDERS

Structural Design, the first group of subjects outlined below and offered in evening classes, is intended for men who are working in offices or drafting rooms on structural work, or for men who are interested in structural work. Building Design, the second group outlined, is intended for men who are working or plan to work in architects' offices, and for those who are interested in architectural work. Both courses will be of much benefit either to men who plan to enter contracting work in the employ of some contractor or to men who intend to go into business for themselves. A University Extension Certificate is given for the successful completion of either group of courses.

The demand for competent workers in the fields of design and building is constantly growing, and the responsibilities of men in charge are great. Financial estimates must be accurate; architectural designs must be pleasing in appearance and in ornamental details. Evening study under competent teachers offers the only practical way for the average man to keep pace with modern progress in this field. He will still need the architect and the structural engineer for the large and more important projects, but the training in these courses will fit him to hold more responsible positions, to bid more intelligently and accurately, and to plan architectural details and supervise small projects more competently.

STRUCTURAL DESIGN

First Year

First Semester	Second Semester
†Mechanics 206a	†Strength of Materials 207

Second Year

Structural Theory 450a	Structural Theory 450b

Third Year

Structural Theory 450c	Structural Theory 450d
Estimating for Builders 497a	Estimating for Builders 497b

Fourth Year

†Reinforced Concrete 417a	†Reinforced Concrete 417b

BUILDING DESIGN

First Year

First Semester	Second Semester
†Mechanics 206a	†Strength of Materials 207

† Meets twice a week.

Second Year

Architectural Drawing 243a	Architectural Drawing 243b
Structural Theory 450a	Structural Theory 450b

Third Year

Estimating for Builders 497a	Estimating for Builders 497b
Architectural Design 1a	Architectural Design 1b

HEATING, VENTILATION, AND REFRIGERATION

This two-year course is offered for builders, draftsmen, engineers, contractors, estimators, building inspectors, and others who will be benefited by a practical course which will help them to plan, install, estimate, and inspect the various types of mechanical equipment which enter into the construction of our modern buildings. The aim throughout the course is to make the work extremely practical.

The course provides a good foundation training for those with little or no previous experience or instruction in the subjects outlined; it should also prove valuable to those who wish a review of the fundamental principles involved in the various subjects.

A certificate is given by the University Extension Division upon the satisfactory completion of the course.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics, especially arithmetic, is required for entrance.

First Year

First Semester

Elementary Engineering Problems 212a	Freehand Industrial Sketching[1] 203Sp.
Estimating for Builders 497a	Estimating for Builders 497b

Second Year

Heating and Ventilating 223a	Heating and Ventilating 223b
Refrigeration 222	

MACHINE DESIGN

Students in evening classes may qualify for a certificate in Machine Design by successfully completing the course as outlined below.

The student who intends to become a machine designer should have as basic training some experience in shop practice. This practice he must secure in some shop where he will learn the uses and limitations of machine tools. At the same time he can qualify in elementary drafting by taking the evening class work in mechanical drawing. This will enable him to secure the necessary skill to advance to the position of draftsman. He must then take up the study of mechanical movements and of mechanical principles,

[1] May be taken by correspondence.

as well as the properties and strength of cast iron, steel, brass, and other material. In this last year he will make a study of the strength and proportioning of parts to withstand the stresses to which they will be subjected in the finished machine.

First Year

First Semester	Second Semester
†Mechanical Drawing 1	†Mechanical Drawing 2

Second Year

†Elementary Mechanics 206a	†Elementary Mechanics 206b

Third Year

†Mechanism 208	†Strength of Materials 207

Fourth Year

†Machine Design 209a	†Machine Design 209b

† Meets twice a week.

LIBERAL EDUCATION

The University of Wisconsin Extension Division in Milwaukee has expanded the facilities for adult education by offering, without paralleling the usual college subjects, a series of courses aiming to give the foundation of a liberal education. The courses are on a college or university plane, but no credit towards a degree is involved. The program is in line with the most recent experiments in this type of education in Europe and America.

The underlying principles and aims of the series of Liberal Education courses may be summed up as follows: To give an opportunity for adults to acquire an education which involves more than the obtaining of information and skill—an education which will lead to emancipation from a "drifting with the group" opinion; an education which will engender capacity for self-criticism; and above all, an education which will create a feeling for those things that make life richer and more significant.

With regard to the method of conducting classes, two types of courses are offered: First, lecture courses accompanied by discussions; and, second, courses organized on the basis of co-operative group activities in which the instructor functions as guide and adviser. In certain discussion courses the enrollment is limited.

The requirement for a certificate in Liberal Education is twelve semester courses. Credit towards a certificate will be given to students who have attended the courses with reasonable regularity and have passed the examinations with a satisfactory grade. **Anyone wishing to take the semester examination should notify the instructor well in advance.** If students present credit for work done at other colleges or universities, such credit may be applied in part fulfillment of the requirement for a certificate.

Ability to carry a course and to profit by it is the only requirement for admission.

Courses in Liberal Education may be chosen from the following fields:

Philosophy Group I	Philosophers from Plato to the Present Day Modern Ethics Thinking
Social Science Group II	Social Problems Our Economic Organization Problems in Government International Relations Introductory Psychology Psychology of Human Behavior Child Psychology Abnormal Psychology

History Group III	Ancient Civilizations Medieval Civilizations Contemporary Civilizations European Influences upon American Life and Institutions History of Religions
Language-Literature Group IV	The Story of Language The Bible as Literature Masterpieces of Foreign Literatures in English Translations English, Irish, and American Poetry from the Beginning of the Nineteenth Century Shakespeare and His Contemporaries Modern American and English Novelists and Dramatists
Art Group V	Appreciation of Painting and Sculpture Appreciation of Music Photography
Biological and Physical Sciences Group VI	Zoology Botany Eugenics Astronomy Chemistry Anthropology Geology Geography
Home Interests Group VII	The Relation of Good Nutrition to Health Home Planning and Decorating Home and Community Health Textiles—Attractive and Appropriate Clothing

In addition, any course listed under Letters and Science, Business, or Engineering may be elected for credit toward a certificate in Liberal Education.

Some of the courses planned for the biennium 1936-38 are:

Modern Drama
Contemporary Poetry
Irish Literary Revival
Twentieth Century Classics
The Contemporary Novel
Study of the Short Story
The Home Garden
Home Planning and Decorating
Home Planning and Decorating (Advanced Course)

French in Everyday Life
Contemporary World Affairs
Post-War Dictatorships
World Imperialism
International Problems and Relations
Polish Literature in English Translation
Current Economic Trends
Psychology of Human Behavior
Primitive Man in Central America (Series of Courses on Primitive Man)
Masterpieces of Art and Music Past and Present
Great Art Galleries of the World
Lectures on Modern Astronomy
The Art of Thinking

ANNOUNCEMENT OF COURSES

For information about courses offered in the evening, credit and non-credit, ask for bulletin on Evening Classes.

The courses listed below will be given during the day, 1937-38. For descriptions and prerequisites, see catalog 1936-38, which will be sent upon request.

I indicates course given first semester
II indicates course given second semester.
I, II indicates course given each semester.

BOTANY

1. General Botany. I, II.	Lab. fee, $5.00	5 credits.
2. Advanced General Botany. II	Lab. fee, $5.00	5 credits.

CHEMISTRY

1a. General Chemistry. I, II.	Lab. fee and deposit, $12.50	5 credits.
1b. General Chemistry and Qualitative Analysis. II.	Lab. fee and deposit, $12.50	5 credits.
3. Qualitative Analysis. II.	Lab. fee and deposit, $2.50	1 credit.
2a. General Chemistry. I, II. For engineering students.	Lab. fee and deposit, $12.50	4 credits.
2b. General Chemistry and Qualitative analysis. II	Lab. fee and deposit, $12.50	4 credits.
11. Quantitative Analysis. Yr.	Lab. fee and deposit, $17.50-$22.50	3-5 credits each semester.
14. Quantitative Analysis. I. For engineering students.	Lab. fee and deposit, $17.50-$22.50	3-5 credits each semester.
20a. Organic Chemistry. I.		2 credits.
20b. Organic Chemistry. II.		2 credits.
21a. Organic Chemistry. I.	Lab. fee and deposit, $17.50	2 credits.
21b. Organic Chemistry. II.	Lab. fee and deposit, $17.50	2 credits.

COMMERCE

8. Elements of Accounting. I.	Lab. fee, $1.50	3 credits.
9. Intermediate Accounting. II.	Lab. fee, $2.50	4 credits.

DRAWING

1. Elements of Drawing. I, II.	Lab. fee, $1.00	3 credits.
2. Elements of Drawing. I, II.	Lab. fee, $1.00	3 credits.
3. Descriptive Geometry. I, II.	Lab. fee, $ .50	3 credits.

ECONOMICS

1a. General Economics. I.	4 credits.
1b. General Economics. II.	4 credits.

ENGLISH AND JOURNALISM

1a. Freshman English. I, II.	3 credits.
1b. Freshman English. I, II.	3 credits.
2a. Intermediate Composition. I.	2 credits.
2b. Intermediate Composition. II.	2 credits.
30a. Survey of English Literature. I.	3 credits.
30b. Survey of English Literature. II.	3 credits.
33a. Introduction to English Literature. I.	2 credits.
33b. Introduction to English Literature. II.	2 credits.
40. American Literature. Yr.	2 credits each semester.

Journalism

1a and 1b. General Survey of Journalism. Yr.	1 credit each semester.

FRENCH

1a. First-Semester French. I, II.	4 credits.
1b. Second-Semester French. I, II.	4 credits.
10a. Third-Semester French. I, II.	3 credits.
10b. Fourth-Semester French. I, II.	3 credits.
15a. Elementary Composition and Conversation. I.	2 credits.
15b. Elementary Composition and Conversation. II.	2 credits.
21a. Elementary Survey. I.	3 credits.
21b. Elementary Survey. II.	3 credits.

FRESHMAN LECTURES

Freshman Lectures for Engrs. Yr. Attendance is **required** of freshman Engineers.	No credit.

GEOGRAPHY

5. Regional World Geography: Natural Aspects. I.	3 credits.
6. Regional World Geography: Cultural Aspects. II.	3 credits.
7. Same as 5 (for Engineering students only). I.	2 credits.
8. Same as 6 (for Engineering students only). II.	2 credits.

GERMAN

1a. First-Semester German. I, II.	4 credits.
1b. Second-Semester German. I, II.	4 credits.
2a. Third-Semester German. I, II.	4 credits.
2b. Fourth-Semester German. I, II.	4 credits.
20. Classical and Modern Writers. Yr.	3 credits each semester
25. Intermediate Composition and Conversation. Yr.	2 credits each semester.

HISTORY

See page 89 of 1936-38 catalog for regulations about history credits.

1a. Medieval History (to 1100) I.	2 or 3 credits.
1b. Medieval History (1100-1500) II.	2 or 3 credits.
2a. Modern European History (1492-1815) I, II.	2 or 3 credits.
2b. Modern European History (1815 to the present) I, II.	2 or 3 credits.
5a. English History (to 1603) I.	2 or 3 credits.
5b. English History (1603 to present) II.	2 or 3 credits.
10a. Ancient History (Orient and Greece) I.	2 or 3 credits.
10b. Ancient History (Hellenistic Age and Rome) II.	2 or 3 credits.
4a. History of the United States (1763-1840) I.	3 credits.
4b. History of the United States (1840-present) II.	3 credits.

MACHINE DESIGN

1. Mechanism. I.	4 credits.
2. Design Practice. II.	1 credit.

MATHEMATICS AND ASTRONOMY

1. Algebra. I, II	4 credits.
For students with one year of high school algebra.	
31. Algebra. I, II.	4 credits.
For students with three semesters of high school algebra.	
2. Trigonometry and Analytic Geometry. I, II.	4 credits.
3. Analytic Geometry. I, II.	3 credits.
5a. Differential Calculus. I, II.	3 credits.
5b. Integral Calculus. I, II.	3 credits.
6. Analytic Geometry of Three Dimensions. II.	3 credits.
7. Theory of Investment. I, II.	4 credits.
50. Sub-Freshman Algebra. I.	No credit.
For engineering students who fail to pass the examination for admission to Math. 51.	
51. Elementary Mathematical Analysis. I, II.	5 credits.
52. Elementary Mathematical Analysis. I, II.	5 credits.
53. Elementary Mathematical Analysis. I.	5 credits.
54. Differential and Integral Calculus. I, II.	4 credits.
55. Calculus. I, II.	4 credits.
112. Differential Equations. II.	3 credits.
119. Introduction to Differential Geometry. II.	3 credits.

Astronomy

1. Elementary Astronomy. II.	3 credits.
6. Navigation and Practical Astronomy. II.	2 credits.

MECHANICS

1. Statics. II (First half of semester).	3 credits.
2. Dynamics. II (Second half of semester).	2 credits

PHYSICS

1a. General Physics. I.	Lab. fee, $7	5 credits.
1b. General Physics. II.	Lab. fee, $7	5 credits.
51. General Physics. I. For sophomore engineering students.	Lab. fee, $7	5 credits.
52. General Physics. II.	Lab. fee, $7	5 credits.

POLISH

1a. Elementary Polish. I.	4 credits.
1b. Second-Semester Polish. II.	4 credits.

PSYCHOLOGY

1. Introduction to Psychology. I, II.	3 credits.
50. Applied Psychology. II.	2 credits.
100. Seminar in Problems in General Psychology. II.	1 credit.
144. Applied Psychology of Learning. I, II.	No credit.

RAILWAY ENGINEERING

1. Railway Curves. I.	2 credits.
2. Theory of Railway Location and Construction. I.	3 credits.

SOCIOLOGY

1. Introductory Sociology. I.	3 credits.
2. Introductory Sociology. II.	3 credits.

SPANISH

1a. First-Semester Spanish. I.	4 credits.
1b. Second-Semester Spanish. II	4 credits.
10a. Third-Semester Spanish. I.	3 credits.
10b. Fourth-Semester Spanish. II.	3 credits.
20a. Elementary Conversation and Composition. I.	2 credits.
20b. Elementary Conversation and Composition. II.	2 credits.
21a. Elementary Survey. I.	3 credits.
21b. Elementary Survey. II.	3 credits.

SPEECH

1. Fundamentals of Speech. I.	3, 2, or 1 credit.
2. Fundamentals of Speech. II.	3 credits.
8a. Extempore Speaking. I.	2 credits.
8b. Extempore Speaking. II.	2 credits.
9. Parliamentary Practice. I.	2 credits.

TOPOGRAPHIC ENGINEERING

1. Elementary Surveying. I.	Lab. fee, $4.50	2 credits.
2. Elementary Surveying. II.	Lab. fee, $4.50	2 credits.
3. Land Surveying. I.	Lab. fee, $3.	3 credits.
104. Advanced Surveying. II.	Lab. fee, $4.50.	3 credits.
108. Short Course in Surveying. II.	Lab. fee, $4.50.	3 credits.

ZOOLOGY

1. Animal Biology. I, II.	Lab. fee, $8.	5 credits.
104. Comparative Anatomy of Vertebrates. II.	Lab. fee, $10.	5 credits.
106. Heredity and Eugenics. I.		2 credits.
107. Organic Evolution. II.		2 credits.

CORRESPONDENCE-STUDY COURSES

The Correspondence-Study Courses offered by the University of Wisconsin, from Madison, provide individual instruction adapted to the special needs of each student. These courses, prepared and conducted by members of the University faculty, may be undertaken in the student's leisure hours at his home. Through them the University and the home are brought into close relationship; and through them also everyone in the state is given an opportunity to obtain the highest education possible at the smallest practical expense. They may be grouped as follows:

Regular university studies, which may be taken for credit toward a degree.

Advanced courses designed to help graduates and others already in professional or practical life to keep in touch with the advancement in science and other fields of knowledge.

High school preparatory studies for those for whom residence study is not available or practical.

Vocational courses which supply knowledge and training in business, industrial, and professional fields.

Elementary and grammar school studies for adults who need such instruction for practical purposes.

Over 400 courses are offered, some of which are listed below:

GENERAL
- Botany
- Chemistry
- Comparative Literature
- Economics
- Education
- English
- French
- General Science
- Geology and Geography
- German
- Greek
- High School Subjects
- History
- Home Economics
- Industrial Arts
- Italian
- Latin
- Library Methods
- Mathematics
- Music

GENERAL (contd.)
- Pharmacy
- Philosophy
- Physics
- Political Science
- Psychology
- Scandinavian
- Sociology
- Spanish
- Speech

BUSINESS
- Accounting
- Banking and Finance
- English
- Insurance
- Law
- Management
- Marketing
- Real Estate
- Secretarial Training
- Statistics

ENGINEERING
- Aeronautics
- Alternating Currents
- Architectural
- Automotive
- Concrete
- Diesel Engines
- Drafting
- Freehand Lettering
- Heat Power Engineering
- Heating and Ventilating
- Hydraulics
- Machine Design
- Mathematics
- Mechanism
- Radio
- Refrigeration
- Shop Sketching
- Show-Card Writing
- Storage Batteries
- Structures
- Surveying
- Telephony
- Watthour Meters

For detailed information, call at the University Extension Division, The University of Wisconsin, 623 West State Street, Milwaukee, Wisconsin, or telephone Marquette 7051.

Or write to the University Extension Division, the University of Wisconsin, Madison, Wisconsin.

UNIVERSITY OF WISCONSIN

UNIVERSITY EXTENSION DIVISION

DEPARTMENT OF EXTENSION TEACHING offers instruction as follows:

CORRESPONDENCE-STUDY: Courses for adults seeking instruction in elementary and vocational subjects as well as for those in candidacy for university degrees or for keeping abreast after graduation.

CLASS INSTRUCTION: In communities throughout the State where sufficient common interest and demand develop for the formation of such classes, conducted usually late afternoons, evenings, or Saturday mornings.

DEPARTMENT OF DEBATING AND PUBLIC DISCUSSION: Furnishes programs for women's clubs and other groups; package libraries; home reading courses; programs and guidance for debating clubs and parent-teacher associations; general information.

MEDICAL LIBRARY SERVICE: Lends books, reprints, and periodicals—current periodicals lent regularly; package libraries on special subjects.

DEPARTMENT OF PUBLIC SERVICE offers service to groups and individuals in Wisconsin through the following bureaus:

BUREAU OF LECTURES AND SHORT COURSES: Provides for lectures by faculty for community events and commencements; offers cost co-operative lyceum courses and short courses and institutes.

BUREAU OF VISUAL INSTRUCTION: Lends educational lantern slides and motion picture films to schools, community organizations, associations, and churches.

BUREAU OF ECONOMICS AND SOCIOLOGY: Collects information on social and economic life of Wisconsin; provides information, counsel, and service for groups and communities relative to their social and economic problems.

BUREAU OF DRAMATIC ACTIVITIES: Offers guidance and direction in the writing and production of plays, pageants, and home chautauquas. Field representative available.

BUREAU OF BUSINESS INFORMATION: (In co-operation with the School of Commerce.) Equipped to answer inquiries on a wide variety of business subjects.

(Information and bulletins sent free on request)
Madison, Wisconsin

BULLETIN OF THE UNIVERSITY OF WISCONSIN
Serial No. 2252; General Series No. 2036.
June, 1937

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BULLETIN OF
THE UNIVERSITY OF WISCONSIN

THE UNIVERSITY EXTENSION CENTER IN MILWAUKEE

Business

Engineering

Letters and Science

Liberal Education

THE UNIVERSITY OF WISCONSIN
UNIVERSITY EXTENSION DIVISION
623 W. State Street Marquette 7051
Milwaukee, Wisconsin

LOCATION OF MILWAUKEE CENTER

THE
UNIVERSITY EXTENSION
CENTER
IN
MILWAUKEE

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1938-1939

THE UNIVERSITY OF WISCONSIN
UNIVERSITY EXTENSION DIVISION
623 W. State Street Marquette 7051
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BULLETIN OF
THE UNIVERSITY OF WISCONSIN

1938

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CALENDAR

1938-39

DAY CLASSES

FIRST SEMESTER

September 13	Tuesday, 2 p.m.	Freshman Convocation; attendance required
September 14, 15	Wednesday, Thursday 9-11 a.m.; 2-4 p.m.	Registration days
September 19	Monday	Instruction begins
September 24	Saturday, 9 a.m.	Condition examinations
September 24	Saturday evening	Faculty-student reception
November 24-27 incl.		Thanksgiving recess
December 17 (noon)-Jan. 2 incl.		Christmas recess
January 14	Saturday, 9 a.m.	Condition examinations
January 14	Saturday, 2 p.m.	Foreign language attainment examinations
January 23-28 incl.	Monday-Saturday	Final examinations

SECOND SEMESTER

February 2, 3	Thursday, Friday 9-11 a.m.; 2-4 p.m.	Registration days
February 6	Monday	Instruction begins
February 22	Wednesday	Washington's birthday; legal holiday
April 1 (noon)-April 9 incl.		Spring recess
April 29	Saturday, 9 a.m.	Condition examinations
May 13	Saturday, 2 p.m.	Foreign language attainment examinations
May 5	Friday (evening)	Mathematics exhibit
May 30	Tuesday	Memorial Day; legal holiday
June 5-10 incl.	Monday-Saturday	Final examinations

EVENING CLASSES

FIRST SEMESTER

September 12-17 incl.	Monday-Saturday	Registration days
September 19	Monday	Instruction begins
October 1	Saturday evening	Faculty-student reception
November 24	Thursday	Thanksgiving Day; legal holiday
December 17-January 2 incl.		Christmas recess
Jan. 16-20 incl.	Monday-Friday	Final examinations
January 23-27 incl.	Monday-Friday	Last week of classes

SECOND SEMESTER

January 30-February 4 incl.	Monday-Saturday	Registration days
February 6	Monday	Instruction begins
May 22-26 incl.	Monday-Friday	Final examinations
May 30	Tuesday	Memorial Day; legal holiday
May 29-June 2 incl.	Monday-Friday	Last week of classes

UNIVERSITY EXTENSION CENTER, MILWAUKEE

General Administrative Staff

Clarence A. Dykstra, A.B., L.H.D., LL.D., President of the University
Frank O. Holt, Ph.M., D.Ped., Dean, University Extension Division
John L. Bergstresser, Ph.D., Assistant Dean, University Extension Division

Milwaukee Administrative Staff

Charles M. Purin, Ph.D., Director
George A. Parkinson, Ph.D., Assistant Director; in charge of Evening Classes
Irene Langwill, B.A., Recorder
Hilmar C. Krueger, Ph.D., Adviser to Men (on leave II)
Florence C. Stehn, M.A., Adviser to Women

Harry T. Avey, M.E., Superintendent of Building
Myron J. Lowe, Field Representative
Elsa L. Jaeck, B.A., Librarian

Milwaukee Office Staff

Betty Lookatch Eisendrath, Secretary to Director
Helen Fish, Assistant to Recorder
Gladys Wagner, In Charge of General Office Staff

Bernice Arlitt
Florence Huber
Catherine Jankowski
Hugo Maechler
Helen Searl
Jean Stoneman
Myrtle A. Volger

Instructional Staff

Full-Time

Avey, Harry T., M.E., Associate Professor of Mechanical Engineering
Babcock, Mary R., M.A., Assistant Professor of English
Baier, Joseph G., Ph.D., Associate Professor of Zoology
Baker, Lynn E., Ph.D., Instructor in Psychology
Baldwin, Leo S., B.A., B.S., Assistant Professor of Drawing
Bardell, Ross H., Ph.D., Assistant Professor of Mathematics
Bell, Earl R., M.A., Instructor in Physics
Brooks, Dudley C., M.A., Instructor in English

Creamer, John J., B.A., LL.B., Associate Professor of English
Deptula, Szymon St., M.A., Instructor in Polish and English
Doering, Helmuth R., B.A., M.B.A., Assistant Professor of Business Administration
Fuller, William J., B.A., Professor of Civil and Structural Engineering
Grant, Hiram E., B.S., Instructor in Mechanical Drawing
Hayes, Merlin L., Ph.D., Instructor in Botany and Zoology
Holmes, Mrs. Elisabeth K., M.A., Assistant Professor of English
Hunt, George T., Ph.D., Assistant Professor of History (On leave, 1938-39)
Hursley, Frank M., M.A., Assistant Professor of English
Krueger, Hilmar C., Ph.D., Associate Professor of History (on leave II)
Kunze, Harry L., M.A., J.D., C.P.A., Assistant Professor of Accounting
Lawrence, Lee E., Ph.D., Instructor in History and Political Science
Marden, Morris, Ph.D., Assistant Professor of Mathematics
Martin, Miles J., Ph.D., Professor of Physics
Millington, Paul E., Ph.D., Associate Professor of Chemistry
Morrison, R. Felix, M.A., Instructor in English
Mowry, George E., Ph.D., Instructor in History
Myers, Raymond H., M.A., Assistant Professor of Speech
Parkinson, George A., Ph.D., Associate Professor of Mathematics
Person, Philip H., Ph.D., Associate Professor of Sociology
Purin, Charles M., Ph.D., Professor of German and Russian
Reinders, Victor A., Ph.D., Assistant Professor of Chemistry
Reinert, Ruth G., Ph.D., Instructor in History
Roeming, Robert, M.A., Instructor in French and Italian
Roth, William E., Ph.D., Associate Professor of Mathematics
Rouse, T. Alton, Ph.D., Assistant Professor of Physics
Schnaitter, M. R., M.A., Associate Professor of Economics
Snyder, H. H., B.S., Instructor in Chemistry
Stehn, Mrs. Florence C., M.A., Assistant Professor of French
Steinfort, Meta M., M.A., Associate Professor of Spanish
Swalheim, Donald, M.S., Instructor in Chemistry
Torinus, Gracia E., M.A., Instructor in English
Town, George G., Ph.D., Professor of Chemistry
Traskell, Charles, B.S., Instructor in Physical Education
Vass, John I., Ph.D., Instructor in Mathematics
Voigt, Mrs. Frieda A., M.A., Instructor in German
Walker, Ruth I., Ph.D., Associate Professor of Botany
Webster, Herbert T., Ph.D., Instructor in English
Weidman, Robert H., Ph.D., Instructor in German
Wesle, Herbert W., B. S., Associate Professor of Topographic Engineering
Wilda, EuGene, B.S., Instructor in Chemistry
Wolf, Louise A., Ph.D., Assistant Professor of Mathematics
Young, Charles E., Ph.D., Professor of Romance Languages

THE UNIVERSITY EXTENSION CENTER IN MILWAUKEE

Over 50 per cent of the people of Wisconsin live in the 20 eastern counties centering around the city of Milwaukee, which comprises only 17 per cent of the territory of the state. Over one-fifth of the people of the state live in Milwaukee county. The Regents of the University, therefore, decided that if the Extension Division were to serve effectively this heavily populated section, an extension center would have to be developed in the city of Milwaukee. Rented headquarters were first established in 1908. Through all the years the only program of service developed there has been extension classes. (Other state-wide services of the Extension Division as carried on from central headquarters at Madison are described on page 101.)

After the World War the federal and state government requested the Extension Division to establish in Milwaukee a curriculum of freshman and sophomore courses in Letters and Science, Commerce, and Engineering for returned veterans whose tuition was to be paid by the government. This was done, and the courses became so popular that a number of Milwaukee parents requested the University to allow their sons and daughters, then graduating from high school and unable financially to go to Madison, to take these courses along with the veterans, and receive college credit. Permission was granted, and in 1923 the Regents of the University offered these freshman and sophomore extension courses to be made available to the graduate of any accredited high school in Wisconsin.

In 1921 the Legislature appointed an interim committee to make a special study of the Milwaukee extension situation, and of the need for a state-owned building. This committee made a printed report of its findings to the 1923 Legislature and recommended an appropriation of $150,000 for an Extension building in Milwaukee, which recommendation was enacted into law in 1925. The 1927 Legislature, after a full hearing by its joint finance committee, voted an additional $175,000 in order to build a building large enough to care for the actual needs. During the 1925 Legislature the State Attorney-General, when requested for a ruling, reported that the University Extension program in Milwaukee and the proposed building were legal and constitutional. From that day to this no policy has been altered that might in any way invalidate this ruling. While in the day classes there has been a normal growth in the number of students taking freshman and sophomore credit courses, in the evening classes the demand is more for the non-credit courses in liberal education and in those business and engineering subjects on a college level which fit one for progress in the industrial world.

One of the reasons why the classes in Milwaukee have been so popular is the fact that they are meeting the need of adults who must work for a living while trying to get an education. Milwaukee, being the largest city

in Wisconsin, offers a great variety of opportunities for adults to find full or part-time employment while taking these courses.

The adult who has already passed the school and college age, who must work and earn his living and in many cases provide at the same time for a family, cannot carry a full residence program of studies. Colleges make out their schedules and curricula to meet the needs of full-time, relatively young students. The class program at the University Extension Division in Milwaukee, on the other hand, is organized to meet the special requirements of adults who are already in the practical work of life. The Extension Division offers courses in the morning, afternoon, late afternoon, and evening, so that an adult may attend classes at any period when he is not working. Since classes in the Extension building are held from eight o'clock in the morning until nine-thirty at night, or for thirteen and one-half hours a day, it is probably the most efficiently used college classroom building in the country.

The building was completed during the summer of 1928. It comprises seven stories and contains twenty-five classrooms and lecture halls, six science laboratories (physics, chemistry (2), biology, engineering, and radio), and a spacious library and reading room.

The kind of institution which the University of Wisconsin Extension Division is developing in Milwaukee is one that can organize a program of study to meet the needs of the individual rather than one that forces the individual to follow a regular curriculum. Among those whose needs are given special attention are the following:

The student who must work and earn part or all of his expenses while taking courses.

The individual who wishes to have a special program of studies suggested by faculty advisers to fit his particular needs and abilities.

The adult who wishes to select his own courses without reference to credit toward a degree or the securing of a certificate.

The student who can afford to devote only two years to preparation for a position that requires college training.

The high school graduate who wishes to do his first two years of college work in an institution near home.

The adult who wishes to broaden his education along lines of his own choice for purposes of self-improvement, intelligent citizenship, and general culture.

GENERAL INFORMATION

LOCATION

Classes are held in the University Extension building at 623 W. State Street, opposite the Milwaukee Vocational School and the City Auditorium. The twenty-five classrooms and lecture halls which this building affords, together with its library and six science laboratories, enable the Extension Division to offer a complete program of studies.

OPPORTUNITIES FOR WORK

Since this institution offers morning, afternoon, and evening classes, it is possible for students to arrange to take work for University credit at convenient hours. Students expecting to earn their way through college are allowed to carry a reduced program of studies upon the approval of the scholarship committee. Milwaukee, being the largest city in Wisconsin, offers a great variety of opportunities for high school graduates to come there from various parts of the state and find part-time employment in many large industrial and business concerns.

REDUCED PROGRAMS

Students in Day Classes are expected to take the full program of the course elected. Applications for reduced programs are approved by the scholarship committee only when the student can show legitimate reasons for the reduction.

GUIDANCE AND COUNSELING

The University of Wisconsin Extension Center emphasizes individual attention to students. This work is carried on by the Guidance Staff. Each student is assigned to a counselor as soon as he enters. With his counselor he can discuss his academic and personal problems as they arise and work out a curriculum that best suits his needs. This is made possible by the varied types of work offered, which include courses in Business, Engineering, Letters and Science, and Liberal Education.

The services of the Guidance Staff are available to high school graduates without cost during the month of August. Students and their parents are invited to arrange for an appointment during this period.

REGISTRATION

Registration consists of filling out the necessary blanks provided at the office and the payment of fees for the courses taken. **The student is not placed on the class roll until he has complied with this rule.**

For dates of registration, see calendar on page 3. The office is open from 8:00 a.m. to 5:00 p.m. and from 7:00 to 9:45 p.m. on all weekdays except Saturday, and from 8:30 a.m. to 12:00 noon on Saturday. During the registration period the office is open continuously from 8:00 a.m. to 9:00 p.m. on all weekdays except Saturday and on Saturday from 8:30 a.m. to 3:00 p.m.

FEES

A fee of five dollars ($5.00) a credit hour is charged for all university credit work in the Extension Division. Laboratory fees and textbooks are additional. The fee for non-credit courses is specified in the bulletins describing these courses.

All fees are payable at the time of registration. One dollar ($1.00) is charged for late registration in the day classes and in the evening classes.

DEFERRED PAYMENTS

In day classes arrangements may be made for the payment of fees in three installments. Under this plan one-third of the amount of tuition, all laboratory fees, and an extra charge of $3 must be paid at the time of registration.

Evening class fees amounting to more than $10 may be paid in two installments. One-half of the total amount plus an extra charge of $1 must be paid at the time of registration.

REFUNDS

Day Classes

Partial refunds to students withdrawing from the day classes are made upon the following basis if written notice is given at the time of withdrawal: within two weeks from the first day of instruction, 80% refund; within four weeks, 60%; within six weeks, 40%; within eight weeks, 20%; after eight weeks, no refund. The late registration fee and the additional fee for deferred payments are not refundable.

Evening Classes

All applications for refunds must be made in writing.

In cases where a class is discontinued or the meeting day of the class is changed after a student has registered, the entire amount of the fees paid will be refunded upon the written application of the student.

Applications for cash refunds not covered by the preceding paragraph must be made before noon of the third Saturday following the beginning of the class; a registration fee of 20% will be retained from each class fee. The late registration fee and the additional fee for deferred payments are not refundable.

A student withdrawing who notifies the office in writing during the period from the fourth to the sixth week inclusive after the beginning of the

class will receive a credit memorandum card covering a fraction of the fee paid, according to the following schedule:

Fourth Week 75%
Fifth Week 70%
Sixth Week 65%

This card is not transferable except to a member of the immediate family of the person to whom it is issued and may be applied on a future enrollment provided it is used within two years from the date of issue.

The business office of the Milwaukee Center may in unusual cases extend the period indicated above for the granting of credit cards in instances where the student withdrew before the end of the sixth week of school but failed, for some unavoidable reason, to make application for a credit refund until after the end of the six-week period.

Books and Supplies

In order to serve the student body effectively, the Extension Division operates a book store in which necessary texts and supplies may be purchased.

ATTENDANCE

Day Classes

It is expected that every student will be present at all the meetings of the classes in which he is enrolled. Any student who at the date of the mid-semester examination in any course has been absent from more than five per cent of the total number of meetings to be held during that semester and who fails to pass said mid-semester examination may be required to drop the course with failure. Any student whose percentage of absences for any semester in any course exceeds ten per cent of the total number of meetings scheduled for that course may be excluded from the final examination and given a condition.

Absence from a recitation immediately preceding or following the Thanksgiving or Christmas or Spring Recess shall count as two ordinary absences.

Absence from a quiz section carries a grade of zero for the period covered by that quiz section unless the work is made up to the satisfaction of the instructor concerned.

Evening Classes

Students desiring University credit are not allowed more than two absences a semester in any two-credit course. Those having absences in excess of that number shall satisfy the instructor that the work has been made up by special examination or otherwise before credit is given. In certificate courses four absences are allowed. Absences in excess of this number are to be made up in a manner similar to the procedure as outlined above for credit courses.

All students who receive credit toward a degree or a certificate must take the final examination and make a minimum grade of 70 per cent for the course.

CHANGE OF STUDIES AND DROPPING STUDIES

Day Classes

A student who wishes to make a change in his schedule of studies must secure the written approval of his counselor and of the head of the department concerned.

A student who drops a subject without written permission secured in advance will receive a failure in that study and may be subject to further discipline by the faculty.

DEFICIENCIES

Failures

In general, a student who has failed in any required subject must remove the failure by repeating that subject in class **as soon as it is again offered** and securing a passing grade.

Conditions

The grade of condition is given to a student who has carried a subject throughout a semester with a passing average, but who, failing in his final examination, reduces his semester average to some numerical standing between 60 and 69. In order to remove a condition a student must pass a special examination during his next succeeding semester of residence or it becomes a failure. If, in a course involving both laboratory and classroom work, the condition has been incurred on account of unsatisfactory laboratory or report work, it may be removed by absolving such substantial requirements as the instructor in charge of the course may prescribe. The removal of this type of condition will take effect on the official date for the removal of conditions.

For dates for the removal of conditions, see calendar, page 3. Applications for these examinations must be made to the Recorder ten days before the date given.

STUDENT ACTIVITIES

All student activities, such as student dances, Spotlight plays, etc., must terminate by the middle of May.

Regulations

1. Students who are enrolled for University credit may be **members** of student organizations, subject to the regulations of such organizations.

2. Students who are enrolled for University credit may participate in extracurricular activities, subject to the following restrictions.
   a. Only students who are enrolled for nine or more University credits may participate in extracurricular activities designated as **"major"** and

"**minor,**" except by special permission of the Committee on Student Activities.*

b. Students who enter the University on **probation** or who are placed on **probation** by the Committee on Scholarship may not participate in major or minor activities until such probation is removed. Students on probation may be pledged but not initiated by any fraternity or sorority.

c. Students who are eligible may not at any time carry more than **eight** points in major and minor activities. Every major office or function is to be counted as three points and every minor office or function as two points.

For regulations governing participation in forensic and athletic activities, see pages 13 and 15.

Badger Record

The Badger Record is a weekly newspaper containing news, feature articles, and editorials about school activities. It affords an opportunity for all interested students to do some work in journalistic writing, newspaper make-up, and advertising.

Co-ed Club

The Co-ed Club is the only organized girls' group open to all freshman and sophomore girls.

Discussion Groups

Small discussion groups meet weekly or biweekly to discuss questions of general interest.

Forensics

Students interested in applied public speaking may participate in inter-squad and intercollegiate after-dinner speaking, debate, discussion, extemporaneous speaking, and oratorical contests. Only students with better than average scholastic standing in courses making up a normal credit load are eligible for intercollegiate forensic activities.

Forestry Club

Membership is open to all Pre-Forestry students and to all other students interested in forestry. The purpose of the organization is to give students a knowledge of the field of forestry and to aid in conservation practices. Meetings are held twice each month. They may be either in the nature of special lectures or of field trips.

German Club

The German Club, which meets twice a month, aims to acquaint its student members with Germany and its people and with the achievements of

* A list of the major and minor activities will be found on the official bulletin board.

Germany in the fields of art, science, and literature. In addition it furnishes supplementary practice in language work. Musical numbers, presentation of plays, recitations, short talks on cultural subjects, and singing of popular folk-songs make up the programs. Other meetings held during the year are of a purely social character intended to promote good fellowship. Some of the meetings are open to the public.

Greek Letter Societies

Social

The sororities, Phi Delta Delta and Tri Omega, and the fraternity, Gamma Kappa Phi, are local organizations.

Honorary

The Alpha Chapter of Sigma Epsilon Sigma, a branch of the Alpha Chapter of the University of Wisconsin, was installed at the Milwaukee Center in the fall of 1937. All women having completed their freshman year with a scholastic average of 2.5 or more are eligible.

Mathematics Club

The Mathematics Club is an organization of the students who are interested in mathematics. The club holds monthly meetings at which papers are presented by students and members of the faculty. A portion of each meeting is spent in playing mathematical games and in the solution of mathematical puzzles. The purpose of the club is to stimulate the interest of students in mathematics by discussing many interesting phases of the subject which cannot be taken up in the classroom, and by showing the fundamental relation of mathematics to the other sciences.

For information about the Euler prize, see page 17.

Mathematics Exhibit

During the second semester, the Mathematics Club has an evening meeting to which it invites all members of high school mathematics clubs in the city. All other students interested in mathematics are welcome. The members present a program consisting of several talks on various topics in mathematics. Also, there is an exhibit of mathematical models, instruments, drawings, and computing machines. Many of the drawings and models are made by the students during the school year. For date, see calendar on page 3.

Photo Club

The Photo Club is a group of ambitious amateur photographers organized under the auspices of the Department of Physics. The purpose of the organization is to improve photographic techniques and to promote an interest in pictorial photography. Meetings are held twice each month, the programs consisting of discussions and demonstrations of photographic processes. Membership is not limited to students. Anyone who is intereted in pho-

tography may join the club. An annual exhibit of the work of the club is held in the spring.

Polish Club

Any student of Polish origin or any one interested in Poland, Polish culture, or the Polish language is eligible to join this club, which meets every other Monday. Members of the club participate in Polish crossword puzzle contests, anagrams, attend various Polish cultural functions in the city, and cooperate with other local groups having similar interests. Correspondence is carried on with Polish students in Poland who are studying the English language. Social activities usually close the meeting.

Spanish Club

All students now studying Spanish as well as others who have studied Spanish in the past are eligible to membership. The members plan to hold monthly meetings with carefully prepared programs. Each program consists of two distinct parts: first, a formal program of special numbers such as talks, reports, music, dancing, dialogues or plays; second, a social program with informal group songs, games, and contests.

Spotlight Club

Students desiring experience in acting, producing, costuming, or writing plays are welcome in the Spotlight Club. A short dramatic program is given at each of the biweekly meetings.

Student Council

Four representatives from the freshman class and four representatives from the sophomore class, elected at convocations, serve as the Council.

The Student Council aids directly in the administration of student affairs. It is the official organization for student expression in matters pertaining to the welfare of the school.

The Student Council acts as co-ordinator of extracurricular activities and provides supervision of the library and recreation and study rooms. In fulfilling its purpose of promoting the best interests of the student body, it is a clearing house for student problems.

PHYSICAL ACTIVITY REQUIREMENT

Regulations Concerning Physical Activities for Men.

A. Physical activity requirement.[1]

The physical activity requirement may be met in one of two ways:

(1) Three hours a week of physical education work at a recognized gymnasium.

[1] Students who transfer to the University at Madison with at least sophomore standing are automatically exempt from the physical activity requirement.

(2) Participation in major sports[1] at the Milwaukee Center to the extent of at least 102 hours.

B. Participation in intercollegiate activities.

The requirements for membership on an intercollegiate team are based upon the following regulations:

(1) Enrollment for university credit.
(2) No disciplinary probation.
(3) No unsatisfied failure, condition, or incomplete.
(4) Consent of the Coach.

Students expecting to receive physical education credit must enroll with the Athletic Committee at the beginning of the semester.

Regulations Concerning Physical Activities for Women.

The physical activity requirement may be met in one of two ways:

(1) Two semesters of physical education work at an approved gymnasium.
(2) Participation in certain sports under an approved director.

Students expecting physical education credit must enroll with the Adviser to Women at the beginning of each semester.

SCHOLARSHIP AWARDS

The Gamma Kappa Phi Fraternity each year awards a cup on which is engraved the name of the student who is selected by the faculty as having achieved a superior record in general scholarship and as having shown school loyalty and fraternal spirit. In addition, a scholarship emblem is presented to the winner. Students competing for this honor must have taken at least three semesters' work at this institution.

A similar cup is awarded, through the courtesy of Mr. George Brumder, for superior work in German. The candidates competing for this award must have studied German at the Extension Division for at least two semesters and must have obtained not less than 28 credits in that year, with a minimum average of C.

Sophomore Honors and Sophomore High Honors are awarded at the close of the year to those students who have made records similar to those required for obtaining the same honors at the University of Wisconsin.

A special award is granted each year to the sophomore who has the highest number of grade points per credit for two full years' work at the Extension Division.

Freshman Honors are awarded each year to three students having the highest number of grade points per credit for that year. The standing of the various students is computed upon the basis of their first semester grades and the mid-semester grades of the second semester. A student eligible for this award shall have carried a full schedule of work, that is to say, shall

[1] A complete list of the available sports will be posted on the official bulletin board.

have completed a minimum of 28 credits of work by the end of the semester in which the award is made.

THE HENRY HARNISCHFEGER AWARD

Beginning with the academic year 1929-30, and extending over a period of ten consecutive years, an annual prize of fifty dollars is provided by the late Mr. Henry Harnischfeger of Milwaukee and his heirs for the best German essays. Candidates must have studied German in the high schools of Milwaukee (suburbs included), for at least four semesters. The prizes are awarded by a jury, consisting of three members, to the students writing the best German essays on an assigned topic. The date of the essay contest, which is held at the University Extension Center, 623 West State Street, is communicated to the high school principals and their German staffs two weeks in advance.

THE EULER PRIZE IN MATHEMATICS

A prize is awarded annually at the commencement exercises in June for the best paper presented by a student before the Mathematics Club on a subject chosen by the student and approved by the Department of Mathematics. The prize is known as the Euler Prize. If, in the opinion of the mathematics faculty, no paper is presented before the Mathematics Club which merits the awarding of the prize, no prize is awarded.

THE LIBRARY

The library contains approximately 8,500 books. It receives, currently, 90 periodicals of both general and technical interest.

Books may be drawn for home use for a two-week period, with the exception of reference books and books reserved by the faculty for supplementary reading. Reserve books are available for a two-hour period.

Library hours

8:30 a.m. -9:30 p.m. Monday—Friday
9:00 a.m.-12:00 a.m. Saturday

The library is closed during the summer.

LECTURE BUREAU

The University Extension Division in Madison strives to make its services readily available to societies, organizations, study groups, and the public. It maintains a special bureau through which arrangements may be made for lectures by members of its faculty. These lectures include discussions and demonstrations in many fields: astronomy, business, chemistry, child guidance, linguistics, literature, mathematics, physics, radio, travel, zoology.

Persons desiring speakers for clubs, assemblies, business or technical gatherings, or study groups should get in touch with the Bureau. The fee for the lecture may be arranged with the Bureau. Information regarding this service may be obtained by writing the Lecture Bureau, University Extension Division, Madison, Wisconsin.

UNIVERSITY CREDIT COURSES

ADMISSION

REQUIREMENTS FOR ADMISSION BY CERTIFICATE

Sixteen units are the fundamental requirement for regular admission to any college or course in the University.

I. The usual means of gaining admission to the University is by presenting a certificate of graduation from an accredited four-year or an accredited senior high school showing satisfaction of the underwritten requirements and bearing the principal's recommendation of the candidate's fitness for college. Graduates of four-year non-accredited schools in Wisconsin who have satisfied the full requirements for admission to the University may be admitted on probation, without examination, upon recommendation of the principal.

1. Definitions. A *unit* represents a norm of five class-periods per week in one field of study for a school year of at least 36 weeks. Two laboratory periods in a science or other subject are considered equivalent to one class period. In subjects not usually taught throughout an entire school year, a unit may be constructed by adding the respective time values of two related subjects.

Except in foreign language (see below), a *major* consists of three or more units in one field of study and a *minor* consists of two units in one field of study.

"Unrestricted" admission to the University is admission which opens to the student all colleges, courses, and fields of study to which freshmen are eligible and insures full freedom of choice among all the college majors and fields of specialization. "Restricted" admission opens to the student such colleges, courses, and fields of specialization as do not require high-school mathematics as background. It does not give admission to the College of Agriculture or the College of Engineering or the Course in Chemistry, and does not permit the student to major or specialize in chemistry, commerce, economics, mathematics, pharmacy, pre-medicine, philosophy, political science, psychology, or sociology, or in any of the other natural sciences including physical geography and geology, or to graduate from the School of Education with a major or minor in any of these fields.

2. Sixteen units are required of a graduate of a regular four-year high school for admission as a regular student to any college or course open to freshmen.

3. Admission of such graduate shall be based upon: (a) the completion of two majors and two minors selected from four of the fields in Group A (below); one of these majors shall be English and Speech (unless the candidate offers a minor in foreign language, in which case a minor in English and Speech will suffice); and for "unrestricted" admission one major or minor shall be mathematics, *i.e.*, one unit of algebra and one unit of plane geometry, with an additional half-unit of algebra in the case of those who seek unqualified admission to the College of Engineering; and (b) the completion of the additional units necessary to make a total of sixteen units selected from Group A and Group B (below), with the provision that not more than six of the sixteen units may be presented from Group B. Pupils planning early in their high-school career to enter the College of Letters and Science or the College of Engineering are advised to present all sixteen units from Group A. Until further action by Faculty and Regents not more than two units in advanced applied music or, alternatively, in art will be accepted under Group A. (Broadly speaking advanced applied music may be provisionally defined as applied music based upon two years of preparation in band or orchestra, or equivalent preparation in chorus. The units in art shall be based upon adequate preparation in freehand drawing in the grades or an equivalent.)

4. Graduates of high schools which maintain a senior-high-school division shall present twelve units from this division to include: (a) one major and two minors selected from three of the fields in Group A or four minors selected from four of the fields in Group A; one major or minor shall be in English and Speech, and for "unrestricted" admission one major or minor shall be mathematics (as described above) unless, before entering the senior-high-school, the entrant has completed one of the two units in mathematics specified in the preceding sub-section, in which case the completion of the second unit will suffice. (b) The remaining units shall be selected from Group A and Group B (See advice in preceding sub-section.)

Fields of Study

Group A

English and Speech	Mathematics
Foreign Language	Natural Sciences
History and the Social Sciences	Advanced Applied Music or Art

Group B

Agriculture	Industrial Arts
Commercial Subjects	Mechanical Drawing
Home Economics	Optional (2 units)

5. The foreign languages accepted for admission are French, German, Greek, Hebrew, Italian, Latin, Norse, Polish, and Spanish. If foreign language is offered under Group A, it must consist of at least a minor in one language. Three or more units in one foreign language or two units

in each of two foreign languages shall constitute a major. A single unit of foreign language (i.e., one unaccompanied by a foreign-language minor) may be offered as an optional subject under Group B. (Four units in one foreign language are preferable to two units in each of two foreign languages.)

6. "Restricted" standing may at any time at the option of the student be changed to "unrestricted" standing by the mastery, subsequent to high-school graduation, of the content of high-school algebra and plane geometry by private study, tutoring, or correspondence study. The University will not provide residence instruction in this preparatory work.

II. Graduates of Wisconsin high schools need not meet the above requirements if, on the combined basis of rank in graduating class and aptitude and achievement tests satisfactory to the University, they stand in the upper twenty-five per cent of the average freshman class entering the University and are recommended for college by the high-school principal; but their admission will necessarily be "restricted" unless their preparation includes the two units in mathematics. This does not apply to candidates for admission who have graduated from schools outside the state of Wisconsin.

OTHER METHODS OF ADMISSION

For information about admission on the adult special basis and admission upon examination apply to the Recorder, University Extension Division, Milwaukee.

UNDERGRADUATE CREDIT

The total number of credits that may be earned in the Extension Division combining instruction in day classes, evening classes, and correspondence can not total more than the equivalent of two years' credit in any curriculum.

Graduates of junior colleges or those who have finished two years of work at a four-year college are permitted to elect suitable courses of junior rank if they are offered at the Milwaukee Center. Such students may elect freshman or sophomore work if the requirements for the degree they seek include such work. The nature of this work will be determined by a committee of the faculty of the Milwaukee Center, and the amount is not to exceed two year-courses.

All candidates for degrees must expect to take their senior year in residence. The minimum residence requirement is 30 credits and 30 grade points, to be earned in at least two semesters at Madison (or six summer sessions, in no one of which may less than four credits be carried). All the requirements of the major subject must be met, including at least 15 credits and 15 grade points in advanced work (in some departments 20) in residence. If application is made in advance, very exceptional cases may be given special consideration by the dean or the executive committee of the College of Letters and Science.

Credits and Grade Points

In order to receive a degree the student must have not only the number of credits required in the course which he is pursuing, but his studies must reach a certain average of excellence. This standard is fixed by the grade-point system, which requires for graduation from any course as many points as credits. The following table shows the University scale of grading, together with the number of points per credit for each grade:

Grade	Percentage Equivalent	Points per Credit
A (Excellent)	93-100	3
B (Good)	85- 92	2
C (Fair)	77- 84	1
D (Poor)	70- 76	0
Condition	60- 69	0
Failure	Below 60	0

A student in the general courses in Letters and Science who has received a grade of **B** in **each** subject of the preceding semester may take not to exceed 18 credits.

UNIVERSITY COURSES OF THE FRESHMAN AND SOPHOMORE YEARS

The University Extension Division offers freshman and sophomore programs of study in the following courses:

Chemistry	Pre-journalism
Engineering	Pre-law
Letters and Science (General)	Pre-medicine
Pre-commerce	Pre-nursing
Pre-education	Social Work

All of these courses are approved by the respective residence departments at Madison and carry full credit toward a university degree.

Students who plan to take

Agriculture	Medical Technology
Art Education	Music
Home Economics	Pharmacy
Library Course	Physical Education

should consult the recorder about adjustment of programs.

Students who expect to transfer to the School of Education are advised to adapt the requirements of the first two years of one of the General Courses to the requirements as stated on pages 25 and 26.

LETTERS AND SCIENCE CURRICULA

Recommended Sequences for Freshman and Sophomore Years

(For complete information about requirements, see bulletin of College of Letters and Science)

1. **B.A. General Course** (includes foreign language)

Freshman

		Credits per semester
English 1a-1b		3
Foreign language		3-4
History	Two of these are required, at least one to be taken in the freshman year.	3
Mathematics		3-4
Science		5
Physical activity requirement		
		14-16

Two foreign languages may be elected if desired. Mechanical Drawing (3 credits) may be elected if the student wishes to take only one study from the mathematics-science-history group in the freshman year.

Sophomore

	Credits per semester
English 30a-30b	3
or 33a-33b	2
Foreign language (if requirement has not been met)	3-4
Freshman requirements (if not met the first year)	?
Electives	?
	14-16

2. **Ph.B. General Course** (without foreign language requirement).

Freshman

		Credits per semester
English 1a-1b		3
Mathematics	One or both of these or two sciences	3-4
Science		5
Foreign lang.	Two of these are required, at least one to be taken in the freshman year.	3-4
History		3
Mathematics		3-4
Physical activity requirement		
		14-16

Mechanical drawing (3 credits) may be elected in place of one subject in either of the groups specified above, provided the student takes the second subject in his sophomore year.

Sophomore

The study list for the sophomore year must include English 2, intermediate composition, two credits each semester, unless the student has passed an intermediate knowledge examination, or has completed successfully one year of foreign language in college. The study list must also include whatever subjects are necessary in order to complete the science-mathematics option and the history option commenced in the freshman year. If the philosophy and psychology option is chosen, work on it should commence during the sophomore year. In the event the foreign-language option has been met by examination, the student should have about twelve credits of free electives each semester of this year.

3. Chemistry Course (leading to B.S. degree)

Admission to the junior year in the Chemistry Course is restricted to those students who have a grade-point average of 1.5 or better for courses in chemistry, mathematics, and physics.

Freshman

	Credits per semester
Chemistry 1a-1b and 3	5-6
English 1a-1b	3
German or French	3-4
Mathematics	3-4
Physical activity requirement	
	16-17

Sophomore

	Credits per semester
Chemistry 11a-11b	5
German or French	3-4
Mathematics 5a-5b	3
Physics 1a-1b	5
	16-17

4. (a) Pre-commerce Course (leading to B.A. degree)

Admission to the School of Commerce is restricted to those students who have a grade-point average of 1.3 or better for their work in the College of Letters and Science, this work to include Economics 1a, Commerce 8, and Commerce 9.

Students not presenting Economics 1a and Commerce 8 and 9 **may** be admitted by the Director of the School on probation; their admission must not be taken for granted.

Freshman

	Credits per semester
English 1a-1b	3
Foreign language	3-4
Mathematics[1]	4
History 3 or 5 credits	3-5
or	
Science 5 credits	
Physical activity requirement	
	14-16

Sophomore

	Credits per semester
Accounting (Econ. 8-9)	3-4
Economics 1a	4
English 30a-30b	3
or 33a-33b	2
Foreign language	3-4
Elective	?
	15-16

(b) Pre-commerce Course (non-language, leading to Ph.B. degree)

Freshman

	Credits per semester
English 1a-1b	3
History	3
Mathematics[1]	4
Science	5
Physical activity requirement	
	14-16

[1] Including Theory of Investment (Math. 7).

Sophomore

	Credits per semester
Accounting (Econ. 8-9)	3-4
Economics 1a	4
English 2a-2b[1]	2
History	2-3
Elective	?
	14-16

5. Pre-education Course (leading to B.S. degree in education)

Students who expect to transfer to the School of Education should select one of the following sequences:

Sequence I

A. No foreign language required

B. Required:

English composition, 10 credits (English 1 and 2)
History, 10 credits†
Social sciences, 6 credits‡
Mathematics or philosophy, 10 credits**
Natural science, 20 credits in regular year courses

Sequence II

A. Required:
Intermediate knowledge of one language

B. Required:

English composition, 6 credits; English literature, 4-6 credits
History, 6 credits†
Social sciences, 6 credits‡
Mathematics, 8 credits, or philosophy, 6 credits**
Natural science, 10 credits in elementary survey courses or in regular year courses or in both§

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[1] Not required if foreign language option for Ph.B. degree has been absolved.
† Must include a year course in European (Course 2 or 5) or American history.
‡ Political Science 7 (3 credits), Geography 6 (3 credits), and economics or sociology (3 credits) are recommended.
** Philosophy 21 (3 credits) and Philosophy 11 (3 credits) are required.
§ Must include at least one semester course in the biological sciences, zoology being strongly recommended. It is recommended that the rest of the science requirement be met in the physical (non-biological) sciences.

A. Required: **Sequence IV**
Intermediate knowledge of one language
B. No English literature required
Required:
English composition, 6 credits
History, 6 or 10 credits†
Social sciences, 6 credits‡
Mathematics, 10 or 8 credits **or**
Philosophy, 10 or 6 credits**
Natural science, 20 credits in regular year courses§

A. Required: **Sequence III**
Proficiency in one foreign language, **or**
Intermediate knowledge in two foreign languages, **or**
Intermediate knowledge in one foreign language plus 10 credits in literature courses in that language
B. Required:
English composition, 6 credits; English literature, 4-6 credits
Two of the following:
(a) history, 6 credits†; and social sciences, 6 credits‡
(b) mathematics, 8 credits
(c) natural sciences, 10 credits in elementary survey courses or in regular year courses or in both§

6. Pre-journalism Course (leading to B.A. degree)

Sophomore	Credits per semester
Journalism 1a-1b	1
English 1a-1b	3
Foreign language (one or two)	3-8
History 1a-1b, 2a-2b, 5a-5b, or 10a-10b	3
Science or Mathematics[1]	5-4
Physical activity requirement	
	15-16

Freshman	Credits per semester
English 30a-30b	3
Economics 1a-1b	4
Electives Recommended: Political Science 7; History 4; Psychology	8-9
	15-16

† Must include a year in European (Course 2 or 5) or American history.
‡ Political Science 7 (3 credits), Geography 6 (3 credits), and economics or sociology (3 credits) are recommended.
** If philosophy is chosen, Philosophy 21 (3 credits) and Philosophy 11 (3 credits) are required.
§ Must include at least one semester course in the biological sciences, zoology being strongly recommended. It is recommended that the rest of the science requirement be met in the physical (non-biological) sciences.
[1] Science recommended.

7. Pre-legal Course

Same as either Curriculum 1 or 2 above.

Note: Three years of undergraduate work in Engineering is accepted for admission to the Law School, provided it includes 6 credits in Social Sciences.

8. (a) Premedical Course (leading to B.A. degree)

Freshman

First Semester	Credits	Second Semester	Credits
Chemistry 1a[1]	5	Chemistry 1b	5
English 1a	3	English 1b	3
French or German	3-4	French or German	3-4
History or Mathematics	3-4	History or Mathematics	3-4
Physical activity requirement		Physical activity requirement	
	15-16		15-16

Sophomore

Chemistry 20a, 21a	4	Chemistry 20b, 21b	4
English 30a or 33a	3-2	English 30b or 33b	3-2
French or German	3-4	French or German	3-4
Zoology 1—Animal Biology	5	Zoology 104	5
	15-16		15-16

(b) Premedical Course (leading to B.S. degree)

Freshman

First Semester	Credits	Second Semester	Credits
Chemistry 1a[1]	5	Chemistry 1b	5
English 1a	3	English 1b	3
French or German	3-4	French or German	3-4
Mathematics	4-3	Mathematics	4-3
Physical activity requirement		Physical activity requirement	
	15-16		15-16

Sophomore

Chemistry 20a, 21a	4	Chemistry 20b, 21b	4
French or German	3-4	French or German	3-4
Zoology 1—Animal Biology	5	Zoology 104	5
Electives	3	Electives	3
	15-16		15-16

[1] Premedical students entering the second semester substitute Zoology 1 (Animal Biology) for Chemistry 1a in their curriculum.

PRE-FORESTRY PROGRAM

The subjects listed below correspond closely to the requirements of the forestry courses offered by institutions in other states. Since many schools require attendance at a camp during the summer following the sophomore year, students are advised to consult at an early date the institution to which they plan to transfer.

Freshman

First Semester	Credits	Second Semester	Credits
Botany 1	5	Botany 130	3-4
English 1a	3	Drawing 1	3
Mathematics	4	English 1b	3
Topographic Engr. 1	2	Mathematics	4
	14	Topographic Engr. 2	2
			15-16

Sophomore

Chemistry 2a	4	Chemistry 2b	4
Economics 1a	4	Economics 1b†	4
Topographic Engr. 3	3	Zoology 1	5
Elective	4-5	Elective	3
	15-16		16

Desirable electives include:

Physics 1a, 1b
Geography
English 30 or 33
Speech 1, 2, 8

† A course in history or social science may be substituted for Economics 1b.

ENGINEERING CURRICULA

Leading to the Degree of Bachelor of Science

Freshman Lectures

A course of lectures is provided for freshman engineers. A few of these lectures will be on subjects of general interest. For the most part, however, the lectures will give the student an idea of some of the problems of the engineer in practice. This series of lectures should help him to realize that the various courses of study are each a necessary part of his training.

Some of the lectures will be given by members of the University staff; others by prominent engineers and by representatives of industry.

All freshman engineers are **required** to attend these lectures.

Civil Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Top. Engr. 1—Elementary surveying	2	Top. Engr. 2—Elementary surveying	2
Freshman lectures	0	Freshman lectures	0
Physical activity requirement	0	Physical activity requirement	0
	17		17

Sophomore

	Credits		Credits
Math. 54—Differential and integral calculus	4	Math. 55—Integral calculus	4
Physics 51—Lectures and lab. practice	5	Physics 52—Lectures and lab. practice	5
Top. Engr. 3—Land surveying	3	Mechanics 1, 2—Statics, dynamics	5
Ry. Engr. 1—Railway curves	2	Top. Engr. 104—Advanced surveying and mapping	3
Ry. Engr. 2—Route surveying	3		17
	17		

Mechanical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Non-professional elective	2	Non-professional elective	2
Freshman lectures	0	Freshman lectures	0
Physical activity requirement	0	Physical activity requirement	0
	17		17

Sophomore

	Credits		Credits
Math. 54—Differential and integral calculus	4	Math. 55—Integral calculus	4
Physics 51—Lectures and lab. practice	5	Physics 52—Lectures and lab. practice	5
Mach. Des. 1—Mechanism	4	Mach. Des. 2—Design practice	1
Draw. 3—Descriptive geometry	3	Mechanics 1, 2—Statics, dynamics	5
Non-professional elective	2	Non-professional elective	2
	18		17

Electrical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Speech 8—Extempore speaking	2	Non-professional elective	2
Freshman lectures	0	Freshman lectures	0
Physical activity requirement	0	Physical activity requirement	0
	17		17

Sophomore

First Semester	Credits	Second Semester	Credits
Math. 54—Differential and integral calculus	4	Math. 55—Integral calculus	4
Physics 51—Lectures and lab. practice	5	Physics 52—Lectures and lab. practice	5
Draw. 3—Descriptive geometry	3	Mechanics 1, 2—Statics, dynamics	5
Econ. 1a—Elements of economics	4	Top. Engr. 108 (elective)	3
Elective	2-4		17
	18-20		

Chemical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Elective	2	Elective	2
Freshman lectures	0	Freshman lectures	0
Physical activity requirement	0	Physical activity requirement	0
	17		17

Sophomore

Credits	Credits
Chem. 20a—Organic chemistry 2	Chem. 20b—Organic chemistry 2
Chem.21a—Organic chemistry lab. 2	Chem. 21b—Organic chemistry lab. 2
Chem. 14—Quantitative analysis 5	Math. 55—Integral calculus 4
Math. 54—Differential and integral calculus 4	Physics 52—Lectures and lab. practice 5
Physics 51—Lectures and lab. practice 5	Mechanics 1, 2—Statics, dynamics 5
18	18

Mining Engineering, Metallurgical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Elective	2	Top. Engr. 108—Short course in surveying	3
Freshman lectures	0	Freshman lectures	0
Physical activity requirement	0	Physical activity requirement	0
	17		18

Students who wish to complete the chemical engineering, mining engineering, or metallurgical engineering courses in four years are advised to transfer to the College of Engineering at Madison at the beginning of the sophomore year.

EVENING CERTIFICATE COURSES

BUSINESS

The completion of a well-rounded program of study is of much greater benefit to the student of Business than the taking of separate courses at random. Realizing this, the University of Wisconsin, through the Extension Division, will give a special certificate to young men and women who satisfactorily complete a series of related courses in any one of six special fields. The certificate may be earned in Accounting, in Marketing and Advertising, in Finance and Credit, in Industrial Management, in General Business, or in Secretarial Work. For certificate courses in Real Estate, see page 33.

In order to secure a certificate, a student must have completed satisfactorily twenty-four semester hours (ordinarily twelve courses) in one of the six special fields in which certificates are granted, including all the required courses and certain elective courses. **No course is completed unless a final examination is taken.** The special requirements for each group are listed below.

To complete the requirements for a certificate in three years, it will be necessary, ordinarily, for the student to attend classes on an average of two evenings a week, but he may, if he wishes, extend the time over a longer period of years. A student who is interested in taking a program of courses in preparation for the certificate should consult a member of the business department, who will be his faculty adviser.

Students who have had courses beyond high school should submit their records at an early date for evaluation of credits which can be applied toward a certificate.

The following lists of subjects show which courses are required and which courses may be elected in each of the six certificate groups. In addition to the required courses the student must elect, with the approval of his faculty adviser, enough courses to bring his total up to twenty-four semester hours. With the approval of a faculty adviser, courses not listed in the groups below may be taken as electives.

Each required course is indicated by a dagger (†).

Certificate Course in General Business

†Business Management
Business English or English 1a
English 1b
†Business Correspondence 702a
Business Correspondence 702b
†Accounting 1
†Accounting 2
Accounting 3
Accounting 4
Business Economics 355a and 355b
Business Law
  †101 Contracts and Agency
  102 Business Transactions
  103 Business Organization
  104 Wills, Trusts, Estates, and Real Property
Business Statistics
Business Psychology
Factory Management
Labor Problems
Personnel Management
†Marketing Practice
Advertising Principles
Advertising Campaigns
Salesmanship
Public Speaking
Banking and Credit
†Business Finance
Investments
Fundamentals of Real Estate Practice
Real Estate Financing

Certificate Course in Accounting

Business Management
†Accounting 1
†Accounting 2
†Accounting 3
†Accounting 4
†Auditing 5a
†Auditing 5b
†Cost Accounting 9a
Cost Accounting 9b
C.P.A. Review
Accounting 12
Retail Accounting
Analysis of Financial Statements
Advanced Accounting Problems 11
Governmental Accounting
Income Tax 402a and 402b
Business English or English 1a
English 1b
Business Correspondence 702a and 702b
Business Economics 355a and 355b
Business Law
  †101 Contracts and Agency
  †102 Business Transactions or
  †103 Business Organization
  104 Wills, Trusts, Estates, and Real Property
Banking and Credit
Business Finance
Investments
Factory Management
Business Statistics

One who intends to enter public accounting work will need to take more than the twenty-four semester hours which are required for this certificate. His faculty adviser will gladly make suggestions for further study.

Certificate Course in Marketing and Advertising

†Business Management
Business English or English 1a
English 1b
†Business Correspondence 702a
Business Correspondence 702b
†Marketing Practice
Industrial Marketing
Business Psychology
Business Economics 355a and 355b
†Advertising Principles
†Advertising Campaigns
Retail Advertising
Accounting 1
Accounting 2
Analysis of Financial Statements
Business Statistics
Banking and Credit
Business Finance
Investments
Credits and Collections
Business Law
  †101 Contracts and Agency
  102 Business Transactions
  103 Business Organization
†Salesmanship
Sales Management
Retail Store Management
Public Speaking
Real Estate Selling

Certificate Course in Finance and Credit

†Business Management
†Accounting 1
†Accounting 2
Accounting 3
Accounting 4
†Analysis of Financial Statements
Business Economics 355a and 355b
Business English or English 1a
English 1b
Business Correspondence 702a and 702b
†Credits and Collections
†Business Finance
†Banking and Credit
†Investments
Forecasting Security Markets
Business Law
  101 Contracts and Agency
  †102 Business Transactions
  103 Business Organization
  104 Wills, Trusts, Estates, and Real Property
Real Estate Financing
Life Insurance Fundamentals
Property Insurance

Certificate Course in Industrial Management

†Business Management
†Accounting 1
†Accounting 2
Accounting 3
Accounting 4
†Cost Accounting 9a
†Cost Accounting 9b
Analysis of Financial Statements
Business English or English 1a
English 1b
Business Correspondence 702a and 702b
Business Economics 355a and 355b
Social Security Legislation
Business Psychology
Industrial Marketing
Labor Problems
†Personnel Management
Business Law
  101 Contracts and Agency
  102 Business Transactions
  103 Business Organization
†Factory Management
†Time and Motion Study 250a
Time and Motion Study 250b
Public Speaking
Business Finance

Certificate Course in Secretarial Work

†Business Management
†Business English or English 1a
English 1b
†Business Correspondence 702a and 702b
†Business Psychology
†Accounting 1
Accounting 2
†Secretarial Training 714
Secretarial Training 715
Business Economics 355a and 355b
Business Law
101 Contracts and Agency
102 Business Transactions
Public Speaking
Marketing Practice
Advertising Principles
Salesmanship
Banking and Credit
Business Finance
††Electives

††Those students who know definitely in what fields they are preparing to do secretarial work should go beyond the subjects listed on these pages and choose electives from business courses in the field selected such as Advertising, Accounting, Finance, or Real Estate. This program is also intended to meet the cultural needs of the students who enroll in it. Students may, therefore, choose electives in such fields as English Literature, Modern Language, History, Psychology, and the Social Sciences.

Certificate Courses in Real Estate

The Milwaukee Real Estate Board will issue an official certificate to anyone who is certified by the University Extension Division as having satisfactorily completed four of the Real Estate courses listed below. To students who satisfactorily complete eight of the Real Estate courses listed below will be issued a University Extension Division certificate endorsed by the National Association of Real Estate Boards.

Real Estate Courses

Fundamentals of Real Estate Practice
Real Property Law and Conveyancing
Real Estate Financing
Real Estate Economics
Real Estate Selling
Real Estate Appraisals
Property Management
City Planning and Zoning
Property Insurance

Certificate Courses in Insurance

The University Extension Division is cooperating with the American College of Life Underwriters and the Life Office Management Association Institute in giving courses leading to the designations, certificates, and degrees offered by them.

C. L. U.

The designation Chartered Life Underwriter (C. L. U.) will be awarded to life insurance underwriters who meet the eligibility requirements of age, character, education, and experience, and who satisfactorily pass a series of examinations in the following subjects:

I. Life Insurance Fundamentals
   a. Economics of Life Insurance
   b. Principles and Practices

II. Life Insurance Salesmanship
   a. Principles of Salesmanship
   b. Psychology of Life Insurance Salesmanship

III. General Education (including English)
   a. Economic Problems
   b. Government
   c. Sociology

IV. Laws, Trusts, and Taxes
  a. General Commercial Law
  b. Wills, Trusts, and Estates
  c. Taxation of Insurance

V. Finance
  a. Corporation Finance
  b. Banking and Credit
  c. Investments

L. O. M. A.

Home office employees of life insurance companies will receive a certificate from the Life Office Management Association upon satisfactorily completing the four examinations in Course Number I: Principles of Life Insurance. Those satisfactorily completing Course Number I and the six examinations in Course Number II, Advanced Life Insurance, will become Associates of the Life Office Management Association Institute.

INSURANCE INSTITUTE OF AMERICA

The Extension Division is co-operating with the Milwaukee Board of Fire Underwriters and the Insurance Institute of America in presenting a series of courses that will constitute a well-rounded program of insurance training in the property and casualty fields.

For information as to specific courses, see semester bulletins.

NATIONAL INSTITUTE OF CREDIT

The National Association of Credit Men has established the National Institute of Credit for the purposes of training men and women for credit work. The Milwaukee Association of Credit Men is co-operating with the University Extension Division in offering a series of related courses that will enable men and women to earn the Junior or the Senior Certificate of the National Institute of Credit.

The Institute Curriculum

For the Junior Certificate the following courses (which need not be taken in the order listed) are required, subject to the exceptions mentioned below.

	Hours[1]
Business Economics (see page 47)	30
Credits and Collections (see page 45)	30
Analysis of Financial Statements (see page 43)	30
Business English (see page 46)	30
	120

[1] By "thirty hours" is meant a two-hour course lasting 15 sessions. The two-hour Extension Division classes, which meet once a week for 17 weeks, fully comply with these requirements.

For the Senior Certificate the following courses are required, subject to the exceptions mentioned below.

	Hours[1]
Business Law (see page 48)	30
Merchandising (see page 50)	30
Public Speaking (see page 55)	30
Advanced Credits	30
Total	120

The following changes in the regular curriculum may be made, subject to the approval of the Director of Education.

For the Junior Certificate:

Advanced Credits may be substituted for Financial Statement Analysis.

For the Senior Certificate:

Business Law is required:

Advanced Credits is required unless it has been taken as one of the requirements for the Junior Certificate.

In the Senior curriculum, other business courses may be substituted for Merchandising or Public Speaking; a substitution may also be made for Advanced Credits if that course has been taken as a part of the requirements for a Junior Certificate. Courses suggested as substitutions are: Business Finance, Investments, Salesmanship, and Banking and Credit.

In no case will credit toward a certificate be given for these or other elective courses unless the work is taken in Credit Institute classes.

EACH SUBSTITUTION MUST BE APPROVED BY THE DIRECTOR OF EDUCATION OF THE INSTITUTE OF CREDIT.

Associates and Fellows

The Institute gives recognition to practical experience, as well as to educational training. Students who have been awarded the Junior Certificate and who have had three or more years of actual credit experience are designated Associates of the National Institute of Credit. Students who have been awarded the Senior Certificate and who have had five or more years of practical experience become (provided they are at least 25 years of age) Fellows of the National Institute of Credit.

Registration

All who expect to qualify for the Junior or Senior Certificates must first register at the office of the Milwaukee Association of Credit Men at 715 North Van Buren Street, and then complete their enrollment at the University Extension Division.

[1] By "30 hours" is meant a two-hour course lasting 15 sessions. The two-hour Extension Division classes, which meet once a week for 17 weeks, fully comply with these requirements.

TECHNICAL SUBJECTS

COURSES FOR BUILDERS

Structural Design, the first group of subjects outlined below and offered in evening classes, is intended for men who are working in offices or drafting rooms on structural work, or for men who are interested in structural work. Building Design, the second group outlined, is intended for men who are working or plan to work in architects' offices, and for those who are interested in architectural work. Both courses will be of much benefit either to men who plan to enter contracting work in the employ of some contractor or to men who intend to go into business for themselves. A University Extension Certificate is given for the successful completion of either group of courses.

The demand for competent workers in the fields of design and building is constantly growing, and the responsibilities of men in charge are great. Financial estimates must be accurate; architectural designs must be pleasing in appearance and in ornamental details. Evening study under competent teachers offers the only practical way for the average man to keep pace with modern progress in this field. He will still need the architect and the structural engineer for the large and more important projects, but the training in these courses will fit him to hold more responsible positions, to bid more intelligently and accurately, and to plan architectural details and supervise small projects more competently.

STRUCTURAL DESIGN

First Year

First Semester	Second Semester
#Mechanics 206a	#Strength of Materials 207

Second Year

Structural Theory 450a	Structural Theory 450b

Third Year

Structural Theory 450c	Structural Theory 450d
Estimating for Builders 497a	Estimating for Builders 497b

Fourth Year

#Reinforced Concrete 417a	#Reinforced Concrete 417b

BUILDING DESIGN

First Year

First Semester	Second Semester
#Mechanics 206a	#Strength of Materials 207

Meets twice a week.

Second Year

Architectural Drawing 243a	Architectural Drawing 243b
Structural Theory 450a	Structural Theory 450b

Third Year

Estimating for Builders 497a	Estimating for Builders 497b
Architectural Design 1a	Architectural Design 1b

HEATING, VENTILATION, AND REFRIGERATION

This two-year course is offered for builders, draftsmen, engineers, contractors, estimators, building inspectors, and others who will be benefited by a practical course which will help them to plan, install, estimate, and inspect the various types of mechanical equipment which enter into the construction of our modern buildings. The aim throughout the course is to make the work extremely practical.

The course provides a good foundation training for those with little or no previous experience or instruction in the subjects outlined; it should also prove valuable to those who wish a review of the fundamental principles involved in the various subjects.

A certificate is given by the University Extension Division upon the satisfactory completion of the course.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics, especially arithmetic, is required for entrance.

First Year

First Semester	Second Semester
Elementary Engineering Problems 212a	Freehand Industrial Sketching[1] 203Sp.
Estimating for Builders 497a	Estimating for Builders 497b

Second Year

Heating and Ventilating 223a	Heating and Ventilating 223b
Refrigeration 222	

MACHINE DESIGN

Students in evening classes may qualify for a certificate in Machine Design by successfully completing the course as outlined below.

The student who intends to become a machine designer should have as basic training some experience in shop practice. This practice he must secure in some shop where he will learn the uses and limitations of machine tools. At the same time he can qualify in elementary drafting by taking the evening class work in mechanical drawing. This will enable him to secure the necessary skill to advance to the position of draftsman. He must then take up the study of mechanical movements and of mechanical principles,

[1] May be taken by correspondence.

as well as the properties and strength of cast iron, steel, brass, and other material. In this last year he will make a study of the strength and proportioning of parts to withstand the stresses to which they will be subjected in the finished machine.

First Year

First Semester	Second Semester
#Mechanical Drawing 1	#Mechanical Drawing 2

Second Year

#Elementary Mechanics 206a	#Elementary Mechanics 206b

Third Year

#Mechanism 208	#Strength of Materials 207

Fourth Year

#Machine Design 209a	#Machine Design 209b

Meets twice a week.

LIBERAL EDUCATION

The University of Wisconsin Extension Division in Milwaukee has expanded the facilities for adult education by offering, without paralleling the usual college subjects, a series of courses aiming to give the foundation of a liberal education. The courses are on a college or university plane, but no credit towards a degree is involved. The program is in line with the most recent experiments in this type of education in Europe and America.

The underlying principles and aims of the series of Liberal Education courses may be summed up as follows: To give an opportunity for adults to acquire an education which involves more than the obtaining of information and skill—an education which will lead to emancipation from a "drifting with the group" opinion; an education which will engender capacity for self-criticism; and above all, an education which will create a feeling for those things that make life richer and more significant.

The requirement for a certificate in Liberal Education is twelve semester courses. Credit towards a certificate will be given to students who have attended the courses with reasonable regularity and have passed the examinations with a satisfactory grade. **Anyone wishing to take the semester examination should notify the instructor well in advance.** If students present credit for work done at other colleges or universities, such credit may be applied in part fulfillment of the requirement for a certificate.

Ability to carry a course and to profit by it is the only requirement for admission.

Courses in Liberal Education may be chosen from the following fields:

Philosophy Group I	Philosophers from Plato to the Present Day Modern Ethics Thinking
Social Science Group II	Social Problems Our Economic Organization Problems in Government International Relations Introductory Psychology Psychology of Human Behavior Child Psychology Abnormal Psychology
History Group III	Ancient Civilizations Medieval Civilizations Contemporary Civilizations European Influences upon American Life and Institutions History of Religions

Language-Literature Group IV	The Story of Language The Bible as Literature Masterpieces of Foreign Literatures in English Translations English, Irish, and American Poetry from the Beginning of the Nineteenth Century Shakespeare and His Contemporaries Modern American and English Novelists and Dramatists
Art Group V	Appreciation of Painting and Sculpture Appreciation of Music Photography
Biological and Physical Sciences Group VI	Zoology Botany Eugenics Astronomy Chemistry Anthropology Geology Geography
Home Interests Group VII	The Relation of Good Nutrition to Health Home Planning and Decorating Home and Community Health Textiles—Attractive and Appropriate Clothing

In addition, any course listed under Letters and Science, Business, or Engineering may be elected for credit toward a certificate in Liberal Education.

For descriptions of courses in Liberal Education, see bulletin of Evening Classes.

DESCRIPTION OF COURSES

BUSINESS

M. R. Schnaitter, M.A., Associate Professor of Economics, Chairman
H. R. Doering, B.A., M.B.A., Assistant Professor of Business Administration
Harry L. Kunze, M.A., J.D., C.P.A., Assistant Professor of Accounting; in charge of Accounting Courses

The following full-time members of the Extension Division Staff devote a part of their time to Business Courses.

H. R. English, M.A., Professor of Business Administration
John J. Creamer, B.A., LL.B., Associate Professor of English
Mary R. Babcock, M.A., Assistant Professor of English
James H. March, B.A., M.B.A., C.P.A., Assistant Professor of Accounting
Raymond H. Myers, M.A., Assistant Professor of Speech
Lynn E. Baker, Ph.D., Instructor in Psychology

Part-Time

Ferdinand Aumueller, Instructor in Advertising
Prisca Batz, B.E., Instructor in Secretarial Training
James A. Book, B.S., C.P.A., Instructor in Accounting
Ralph J. Book, B.A., Instructor in Accounting
Russell A. Clark, B.A., LL.B., Instructor in Real Estate Law
Henry C. Fuller, Sr., C.L.U., B.A., Instructor in Life Insurance
John L. Gruber, B.S., Instructor in Credits and Collections
Phil P. Hayes, Instructor in Real Estate
C. A. Holmes, Instructor in Salesmanship
Evans B. Houtz, Instructor in Insurance
Floyd E. Jenkins, B.A., LL.B., Instructor in Business Law
Charles J. Jens, B.S., Instructor in Insurance
H. K. von Kaas, B.S., Instructor in Factory Management
William F. Koch, B.S., Instructor in Insurance
Robert F. Marty, Instructor in Property Management
William M. Metzker, B.A., Instructor in Business Administration
Walter E. Rilling, B.A., Instructor in Accounting
Harrison Saudek, Instructor in Real Estate Appraisals
Milo F. Snyder, B.S., Instructor in Accounting
Leonard E. Zastrow, C.P.A., Instructor in Accounting
Additional instructors to be appointed.

The following descriptions cover courses which may be given during the evening. For time, fee, and instructor, consult schedule, which will be issued each semester.

(‡) Indicates certificate credit.

ACCOUNTING

‡1. Introductory Accounting.

The elementary principles of bookkeeping and accounting are developed rapidly in this course. The practical application of fundamental principles and methods is emphasized by problem work. The subject matter includes: debit and credit; journals; ledgers; controlling accounts; the balance sheet; and the income statement. No knowledge of bookkeeping or accounting is required for entrance. In order to carry on the work satisfactorily, the student will need to spend considerable time on each assignment outside of the classroom.

‡2. Introductory Accounting.

This is a continuation of Accounting 1 and is intended for those who have completed that course or who have had at least one year of bookkeeping in high school. The course deals with the accounting problems of the various forms of business organization; manufacturing accounts; voucher systems; and business papers and documents. A partnership set, a corporation set, and other exercises are covered.

‡3. Intermediate Accounting.

This is the first half of the course in intermediate accounting. It is not a bookkeeping course. Problem material is assigned which requires a thorough foundation in the subject. A study is made of the following topics: single entry; classification of accounts; adjusting entries; working papers; statements; corporation accounting; actuarial science; receivables; inventories; consignments; and installment sales.

Prerequisite: Accounting 2 or two years of bookkeeping in high school.

‡4. Intermediate Accounting.

This is a continuation of Course 3. The topics covered are: tangible and intangible fixed assets; securities; fixed liabilities; current liabilities; funds and reserves; comparative statements; ratios; book value; accounting for variation in profits; and the statement of application of funds.

‡5a. Auditing.

The work of the auditor is a specialized function requiring skill and responsibility. Enrollment for this course requires a thorough knowledge of accounting principles and practice, equivalent to the completion of Accounting 4. Some of the topics treated are: how to begin an audit; division of work between junior and senior accountants; branch auditing; auditing from trial balance and from original records; auditing asset accounts; auditing liability accounts; practical application of principles by a study of actual cases.

‡5b. Auditing.

The following topics are treated: preparation of working papers; opening and closing an audit; audit reports; duties and responsibilities of the auditor; office methods; scope of investigations; analysis of earnings and expenses; system of accounts; and reorganizations. A large number of comparatively short problems are assigned for solution which illustrate a wide variety of situations encountered in audits.

Prerequisite: Auditing 5a or its equivalent.

‡9a. Cost Accounting.

Course 9a deals with the basic principles of accounting for manufacturing costs and the application of these principles in business. The topics which are covered include: cost classification; cost reports; controlling accounts and subsidiary records for inventories, labor, and overhead; the factory ledger; cost journals; forms; job order, process, and standard cost procedure.

Prerequisite: Accounting 2 or the consent of the instructor. Candidates for the certificate in accounting are advised to complete Accounting 3 and 4 before enrolling in this course.

‡9b. Cost Accounting.

This is an advanced course in cost accounting covering standard costs as the outgrowth of cost accounting procedure. The principles are applied not only to production costs but to distribution costs also. The development of standard costs and the three methods of application are fully illustrated through problems and cases. The course is open to students who have completed Cost Accounting 9a or its equivalent.

‡11. Advanced Accounting Problems.

In this course practice is given in analyzing and solving C.P.A. and other advanced problems. A study is made of partnerships; venture accounts; insurance; bankruptcy; statement of affairs; realization and liquidation account; branch accounting; and estates and trusts. Considerable attention is given to consolidated statements. Students should have had at least Accounting 4, before enrolling in the course.

‡12. Accounting Problems Under Social Security Laws.

This course treats of the practical application of the Wisconsin Unemployment Compensation Act and the Federal Social Security Law.

The topics treated are as follows: preparation of contribution reports; unemployment benefit claims; returns under the Federal Social Security Act for unemployment compensation and old age benefit tax; and a complete description of available forms and records required by both the state and federal government.

‡46. Analysis of Financial Statements.

This course is provided for executives, investors, lawyers, and others who are primarily interested in analyzing and interpreting the operating and financial facts of a business.

The following topics are treated: construction of the balance sheet and profit and loss statement; analysis of working capital and fixed assets; interpretation of balance sheet changes; and analysis of the income statement. Statements of railroads, public utilities, banks and mercantile, manufacturing, mining, insurance, and holding companies are studied.

Some training and experience along accounting lines are desirable but not required. Those who plan to go beyond Accounting 3 will get considerable analysis work and, therefore, should not take this course.

‡134. Governmental Accounting.

The course in Governmental Accounting is intended for government officials, employees of governmental units, candidates for the C. P. A. Certificate, and others who find it necessary to have a knowledge of the general procedure of keeping the accounts of a government. It is designed to present the latest theory and practice in keeping the accounts of a governmental unit. Students entering this course should have a thorough knowledge of general accounting principles.

‡143. Retail Accounting.

The accounting and budgeting control problems peculiar to retail stores are covered in this course. Organization and management problems, where they affect the making of the records and their interpretation, are also considered.

Prerequisite: Accounting 2 or its equivalent, or consent of the instructor.

‡135S. C. P. A. Review.

This course is designed for advanced students, and particularly those who are preparing to take the examinations for the Certified Public Accountant's Certificate. Problems and questions which have been selected from Wisconsin and other state C.P.A. examinations are assigned at each meeting. The solutions and the accounting principles involved are fully discussed in class. Emphasis is placed on the method of attacking problems and on the proper presentation of work done.

‡402a. Income Tax Procedure.

The laws and regulations covering income taxes are treated in detail. Their application to the various classes of taxpayers is illustrated by practical problems. The course is designed for those who are not familiar with tax procedure. It is open to students who have had a thorough training in accounting theory and practice and to others with the consent of the instructor.

‡402b. Advanced Problems in Income Tax Accounting.

Course 402b deals with the problems involved in the preparation of returns under the federal and state income tax laws. The problems are approached from the accounting point of view. Consideration is given to the development of such records as will facilitate the preparation of tax returns and supporting schedules.

Prerequisite: Familiarity with income tax laws and procedure.

For University credit courses in Accounting, see page 77.

BANKING AND FINANCE

‡137. Business Finance.

A study is made of the method of financing a going concern by the issue of stocks, bonds, short time notes, and the use of bank loans. From this point, inquiry proceeds into the financial problems of promotion, combination, merger, insolvency, receivership, and dissolution. Attention is given to safeguards against financial losses, including insurance and accounting control, and to causes of business failure and methods of reorganization.

Note: This course should precede Investments, which is offered the second semester.

‡403. Investments.

The principal objective of this course is to equip the student with certain principles which will aid him in the investing of his own funds or the funds of others. The work begins with an outline of economic fundamentals as applied to the field of investments. Standards are developed by which securities may be measured, and application of these standards is made to the formulation of an investment policy for the individual, for the corporation, and for the institution. Individual securities are examined in the light of these principles, and typical investment accounts are constructed.

The course is recommended for Examination V (Finance) of the C. L .U. Examinations.

‡186. Banking and Credit.

The major portion of the semester is devoted to a practical consideration of commercial banking as carried on under the Federal Reserve System, including a study of the following: bank credit, commercial paper, acceptances, rediscount rates, call loans, note issues, reserves, and clearings. Considerable attention is devoted to the analysis and interpretations of bank statements. The course concludes with a discussion of what might be called recent economic tendencies in banking, such as: consolidations, branch banking, state and federal legislation, control through the Federal Reserve System, and a survey of the differences between the banking system of the United States and the systems of several foreign countries.

‡401. Credits and Collections.

The National Association of Credit Men has established a National Institute of Credit, which awards Junior and Senior Certificates to those who have satisfactorily completed a group of related courses as described on pages 34 and 35 of this catalog.

The course in Credits and Collections is one of the courses required for a certificate.

Among the topics covered are: credit work as a profession; the economics of credit; the organization of a credit department; special and general mercantile agencies; other sources of credit information; investigation of credit risks; tactfully refusing credit; analysis of financial statements; instalment credit and collections; collecting by telephone and personal contact; collection psychology; credit and collection letters; the follow-up technique; locating "skips"; insolvent debtors; adjustment bureaus; and legal aspects of credit and collections.

‡404. Forecasting Security Markets.

Men and women who wish to learn the most up-to-date forecasting technique developed by leading authorities will be interested in this course. Among the topics covered are: technical, manipulative, and psychological factors; business "fundamentals" vs. market structure; mechanical forecasters; types of movements; resistance and turning points; out-of-line movements; perspective, figure, area, percentage, and wave charts; moving averages; Dow theory; head and shoulder structures; market strategy; protective rules; selecting individual issues; and forecasting practice.

‡405. Advanced Security-Market Forecasting.

Those who have taken Course 404, Forecasting Security Markets, are eligible to enroll for this advanced work. Others are also eligible with the approval of the instructor.

A critical examination is made of the more advanced methods used by leading authorities. Each member of the group is encouraged to develop his own powers of analysis.

‡406. Practical Business Statistics and Forecasting.

The course emphasizes the application of facts and figures to actual managerial problems. In particular, each member of the group is encouraged to apply the information gained in the course to the business with which he is connected. In addition, the group develops a Milwaukee Business Condition Chart.

Some of the topics considered are: calculating sales opportunities; using statistics to cut costs; determining sales and profit trends; forecasting business conditions; keeping in touch with local business barometers; locating statistical data; constructing and interpreting charts; measuring your customers' wants; understanding the barometers of statistical services.

Business Statistics, see page 55.

Analysis of Financial Statements, see page 43.

BUSINESS ENGLISH AND BUSINESS CORRESPONDENCE

‡700. Business English.

This course is designed for business people who desire to improve their knowledge of spoken and written English. It includes the study of the fundamental rules governing correct English usage, sentence structure, paragraph structure, common grammatical errors, the use and abuse of slang, and the form and composition of a good business letter. The course serves as an introduction to the course in Business Correspondence.

‡702a. Business Correspondence.

The aim of this course is to provide practice in correct business letter writing. The course trains students to write more clearly, concisely, correctly,

and forcefully. Actual business letters are analyzed for the essential qualities of business writing. Special emphasis is placed upon sales letters and letters of application.

‡702b. Business Correspondence.

This course is a continuation of Course 702a and deals largely with human-interest messages found in adjustment letters, credit letters, and collection letters. Some time is spent in covering business reports.

Prerequisite: Course 702a or its equivalent in study and experience.

BUSINESS LAW

‡101. The Law of Contracts and Agency.

The major portion of this course is devoted to a study of the law of contracts, particularly the formation of contracts, operation of contracts, discharge and enforcement of rights under contracts. The relation of principal and agent and the effect of agency relation are made a part of the course.

This course and Courses 102 and 103 are recommended for those intending to take the examination for the Certified Public Accountant Certificate.

It is also recommended for Examination IV (Laws, Trusts, and Taxes) of the C.L.U. Examinations.

‡102. The Law of Business Transactions.

In a simple practical way the course presents the things that business men should know about the principles underlying the law of: (1) the purchase and sale of goods or services, (2) negotiable instruments, and (3) personal property ownership and transfer.

‡103. The Law of Business Organization.

The course deals chiefly with partnerships and corporations and their respective legal advantages and disadvantages as business organizations. The uniform partnership act and the Wisconsin corporation laws are fully discussed. Some time is given to recent laws covering the reorganization and dissolution of business organizations.

‡104. The Law of Wills, Trusts, Estates, and Real Property.

The course offers a background in the law of wills and estates; ownership and transfer of real property; and trusts, including the validity of trusts as governed by the rule against perpetuity.

The course is recommended for Examination IV (Laws, Trusts, and Taxes) of the C.L.U. Examinations.

GENERAL ECONOMIC AND SOCIAL PROBLEMS IN BUSINESS

‡355a. Business Economics.

A course in business economics is essential to an understanding of modern business, as well as being necessary as a foundation in business training. This course will appeal to men and women in all fields or departments of finance, manufacturing, distribution, or public utilities. Particular attention is

given to current economic trends, to illustrative material based on business experience, and to the practical phases of the subject. Those who are preparing for C.P.A. examinations will be especially interested. Mimeographed copies of economics questions asked in recent Wisconsin C.P.A. examinations are furnished each student.

‡355b. Business Economics.

This is a continuation of Business Economics 355a.

Emphasis is placed upon fundamental economic principles, with special application to modern trends and practical business problems. Some of the topics discussed include: prices, the business cycle, business forecasting, the security markets, governmental finance, inflation, and improving our economic system.

‡357. Social Security Legislation.

Business executives, social agency officials and workers, office managers, accountants, those in charge of pay-roll records, and others who have charge of the administration of unemployment insurance and workers' retirement taxes will be interested in this course. Citizens who desire to keep abreast of the latest trends in social security, for their own information, will also be interested.

Real Estate Economics, see page 54.

Purchasing Principles and Practices, see page 52.

INSURANCE

800. Casualty Insurance.

This course is intended for casualty and surety agents who desire further technical knowledge of the business. It is presented from the agent's viewpoint and is designed to aid him in his production and to furnish information enabling him to solicit all of the coverages which he has available. A study is made of each of the casualty and surety lines, the computation of rates, underwriting and selection of risks, and practical aids to selling and solicitation.

810. Property Insurance.

Course 810 is recommended to underwriters, salesmen, and office employees of fire insurance companies and agencies. The course is concerned with the development of property insurance as adapted to American conditions. It includes a brief history of the business, an analysis of prevailing contracts with their essential features, together with discussion of such items as voidances, cancellations, modifications of standard policies, loss adjustments, and the use of standard forms in different states.

801. Principles of Life Insurance.

Upon the successful completion of this course students are prepared to take the examinations given by the Life Office Management Association Institute, as outlined in its Course Number 1.

Others who may not wish to take the L. O. M. A. examinations may enroll in the course for the purpose of improving their general knowledge of life insurance fundamentals.

Among the topics discussed are: history of life insurance; types of companies; plans and uses of insurance; annuities; mortality tables; premium rates; reserves; dividends; policy contracts; special forms of insurance; selection of risks; insurance investments; annual statement; organization of life insurance companies; home office organization; governmental supervision and taxation of life insurance; legal phases of life insurance.

802. Advanced Life Insurance.

The L.O.M.A. includes six examinations in its advanced course. The Extension Division usually covers the work of the advanced course over a two-year period. During a given year it will offer, for example, the material included in Examinations 5, 6, and 7. During the following year it may offer the subject matter covered by Examinations 8, 9, and 10. For further information, the prospective student should consult the semester bulletins issued by the Extension Division or confer with the instructor.

The topics covered by the six examinations are: life insurance accounting; interpretation of annual statement; life insurance investments; agency organization; governmental supervision and taxation; legal aspects of life insurance.

803. Life Insurance Salesmanship.

The first part of the semester is devoted to the principles of salesmanship; the last part is devoted to the psychology of life insurance salesmanship, analysis of sales interviews, general principles underlying selling, strategy of selling.

For courses recommended for Examinations IV and V, see pages 47 and 45.

804. Life Insurance Fundamentals.

This course covers: the nature of life insurance and the basic principles underlying it; family and personal uses of life insurance; investment service of life insurance; business uses of life insurance, with special reference to close corporations and partnerships; classification of policies; annuities; settlement options; the science of life insurance; measurement of risk; principles of rate making. Special attention is also given to professional programming of life insurance and to estate conservation.

NOTE: Life Insurance Fundamentals can be pursued with profit by the layman who is not selling insurance but is interested in it from a business, financial, or protection standpoint. Courses 803 and 804 can be taken by those who cannot qualify for the C. L. U. Designation but who wish to improve their knowledge and ability in the insurance field.

MANAGEMENT

‡350. Business Management (Business Principles).

A broad view of modern business organization and management is gained from this course, which covers the activities, problems, and interrelationships of the principal departments of a business enterprise. Especial attention is

given to the basic principles upon which every successful business is built. The point of view is primarily that of the practical business man. By giving the student a better insight into the activities and problems of the various departments of a business, the course should increase his usefulness to his company.

Among the topics discussed are: forms of business organization; initiating an enterprise; organization of the sales, finance, production, personnel, and accounting departments; planning and operating problems involved in manufacturing, selling, and financing; risks of business and ways of meeting them; business failures, their causes and prevention; interrelationships of departments.

‡601. Factory Management.

Coordination of the factors of production by careful planning is a central theme of this course. Men who are holding or preparing for executive positions in industry will find it a practical study.

The following topics are discussed: management organization; plant location; equipment layout; standardization and simplification; inspection; inventory control; routing, scheduling, and dispatching work through the factory; time and motion study; wage incentives; cost standards; budgetary control.

‡507. Retail Store Management.

The rapid changes which are taking place in the field of retailing make it absolutely necessary that the independent merchant in the relatively small store know more about his business than ever before. He must know what to watch, how to control the merchandising activities in his store, and by what methods he can make sure of operating his store at a profit. This course is organized with those purposes in view. It does not include the complicated methods of large store operation. It shows how small stores can use good merchandising methods without increasing costs. Among the subjects discussed are: layout; display; mark-up; expense control; avoiding wastes; advertising; salesmanship; credits and collections; meeting competition.

Each member of the group has an opportunity to work out the problems which affect his own organization. In this way, as well as through the group discussions, he gets definite, practical help from the course.

MARKETING AND ADVERTISING

‡500. Salesmanship.

Selling knowledge means success for the individual and the organization. This course analyzes the work of the salesman and explains modern methods of increasing sales. Closing the sale is given special attention. Other topics are: dealing with competition; qualifications of the salesman; psychology of the sales process; organizing and working a territory.

‡501. Marketing Practice.

The sales strategy and the trade channels used in distributing consumer goods from the manufacturer to the final user are discussed in this course.

The marketing of agricultural products and of industrial machinery, equipment, supplies, and raw materials are not included.

Among the topics covered are: the characteristics, strength, weaknesses, and special problems of independent stores, department stores, corporate chains, voluntary chains, mail-order houses, house-to-house selling, and consumers' co-operatives; the services and limitations of wholesalers and functional middlemen; choosing a method of distribution; selective selling; price policies; the Robinson-Patman Act; price control and the "fair-trade acts"; buying and turnover; expenses, profits, and losses in marketing; ways of reducing market costs; and finding market information.

The course is particularly helpful to those engaged in sales, advertising, and credit work.

‡509. Industrial Marketing.

The problems of sales strategy and trade organization involved in marketing industrial machinery, equipment, parts, and supplies are dealt with in this course.

Among the topics covered are: analyzing industrial markets; finding the industrial buyer; industrial buying motives and practices; product policies; channels of distribution for industrial products; manufacturers' agents, sales agents, machine tool dealers, and distributors; advantages and disadvantages of direct selling; public warehouses in industrial marketing; the sales organization; sales aids; price policies; selective selling; consignment selling; leasing arrangements; free service; trade-ins; industrial advertising policies; industrial advertising media; relations with advertising agencies; and industrial marketing costs.

‡502. Advertising Principles.

This course is intended for the beginner in the advertising profession. It gives the student a thorough grasp of advertising principles and of the various steps in the preparation of advertisements and advertising literature. Time is devoted to planning and writing copy, making layouts, and producing advertisements through the steps of art work, engraving, typography, and printing. The various advertising mediums such as magazines, newspapers, trade papers, radio, direct mail, and outdoor mediums are discussed. The course is helpful to those who expect to enter the advertising profession as a life's work and also to the busy executive who appreciates the advantages of knowing more about advertising.

‡504. Advertising Campaigns.

In Course 504, a continuation of Course 502, the various forms of advertising are correlated into complete campaigns. At least three campaigns are developed: one of national scope on a product appealing to the general public; an industrial campaign intended to sell a product for use in industry; and a retail campaign or one devoted to selling a service rather than a product. Copy is developed, layouts are planned, mediums are selected, and schedules are arranged as nearly as possible as is done in an advertising department or agency. Although many students have com-

pleted this course satisfactorily without prior training or experience, the completion of Course 502 or some experience in the advertising field is recommended.

‡508. **Purchasing Principles and Practices.**

The purpose of the course is to present and exchange ideas that will be of practical value to those in industry or government who have a general or a professional interest in purchasing. It is sponsored by the Milwaukee Association of Purchasing Agents.

Among the topics discussed are: purchasing procedure, functions, and control; sources of supply and their selection; purchase budgets and accounting; market analysis; traffic and tariffs; legal aspects of purchasing; quotations, specifications, orders, and inspection; governmental and railway purchasing; specialization in purchasing: raw materials, operating supplies, machinery and equipment, maintenance and repair materials, office equipment and machines, office supplies, and printing.

PSYCHOLOGY

‡196. **Business Psychology.**

How may the laws of human nature be used in dealing with people in business? In discussing this question the course deals with such topics as the following:

Vocational Guidance: basic principles in choosing a vocation; the use of psychological tests and occupational analyses; preventing "misfits."

Industrial Psychology: the interview; the value and limitations of psychological tests in selecting employees; job analyses; rating scales as a basis for promotion; industrial relations from the point of view of the worker and from the point of view of the employer.

Psychology Applied to Salesmanship and Advertising: finding the customer's wants; motivation; sales appeal; helping the customer to buy; answering objections; closing the sale; reason why vs. emotional appeals in advertising; psychology in relation to advertising technique.

For other courses in Psychology, see page 95.

REAL ESTATE

‡306. **Fundamentals of Real Estate Practice.**

Real estate values compose nearly half of our national wealth. They are constantly changing, as they are affected by population growth, industrial development, and environment. This is the first course of the program of real estate education sponsored by the Milwaukee Real Estate Board and the National Association of Real Estate Boards.

The discussion includes the following topics: the real estate market; the value of real estate; apartments and business structures; industrial property; city planning; forecasting city growth; finding property and prospects; financing real estate transactions; building and loan associations; mortgages; real estate brokerage; managing a real estate office.

‡**308. Real Property Law and Conveyancing.**

The course covers the basic principles of the law of contracts with particular emphasis on contracts relating to real estate. It includes the law of principal and agent in its relation to the real estate broker, the various kinds of estates and titles, and the importance of abstract or title insurance. The listing contract, option, deed, mortgage, land contract, and lease are treated as well as the manner of executing such instruments. Certain court actions, as "action to quiet title" and the foreclosure of mortgages, are considered during the progress of the course.

‡**309. Real Estate Financing.**

This course is especially useful to real estate brokers and salesmen, to officers and employees of banks, investment houses, mortgage companies, and building and loan associations. It includes practical information on the financing of homes, small stores, industrial sites, office buildings, subdivisions, and apartment houses; the sources of funds for real estate loans; sound appraisal methods; choosing of profitable sites; financial houses furnishing real estate funds, their requirements, organization, and methods of operation; forms of real estate credit; mortgages, land contracts, bond issues, and participation certificates; ground rent systems and long-term leases; and the part played by building and loan associations in financing home ownership.

‡**310. Real Estate Appraisals.**

Correct appraisals are essential to success in the real estate business. This course emphasizes the economic theory of scientific appraising as well as its practical application to every form of real estate appraisal. The topics discussed are: the relation of zoning and land restriction in the appraisal of real estate; obsolescence and depreciation in residential property; how building costs affect value; the theory of appraising on an income basis. Lectures together with some field work cover the appraisals of the following types of property: vacant residential buildings; a moderately priced home; apartment houses; a combination store, apartment, and office building; vacant industrial property; improved industrial locations; property with misplaced improvements; and lands taken in condemnation proceedings.

‡**311. Real Estate Selling.**

Real estate selling is no longer a haphazard process. It has become a scientific procedure. The salesman must be prepared to sell the services of the realtor and of his own organization and to analyze the realty he is to sell and the market for it. He must be able to carry out his firm's selling policies and to cooperate with its advertising. Finally, he must understand the actual steps in making a sale. In covering these subjects, this course helps not only the salesman to make sales, but it also aids him in progressing toward sales management and eventually a business of his own.

‡**312. Property Management.**

The task of the property manager is to get the greatest possible return from property by putting it to the best possible use. As a merchandiser of

space he will first study the possibilities of a location, whether the ground floor space, for example, is most suitable for a restaurant, a drug store, or a men's clothing store. Having determined what the building is most logically suited for, he will develop a renting campaign to secure tenants.

The present day building manager is informed about the characteristic features of office buildings, apartment houses, stores, and other types of income-producing property. He knows how to make suitable arrangements of floor space and how to provide proper light, heat, and ventilation. He knows what type of service his tenants need and expect. He is familiar with the most efficient maintenance methods and with the less complicated, but important, tasks of collecting rents, keeping accounts, and directing a clerical staff.

This course has been developed to meet the needs of those who have property management problems. It should be of interest to real estate men; building managers; officers of banks, trust companies, and insurance companies; lawyers who have been charged with the management of estates; and large property managers.

‡313. Real Estate Economics.

More than 56 per cent of the people of the United States now live in cities, and almost four-fifths of the workers of America are engaged in non-agricultural occupations. The growth of cities has been so rapid that the nation has not adjusted itself to urbanization.

The growth of cities, the location and migration of industries, and the movements for centralization and decentralization are covered in this course. A study is made of public and private uses of land within cities and the way in which these uses may be directed and controlled through planning and zoning. The public aspect of housing and housing programs is given much consideration. The course directs attention to the interrelation of the city with its hinterland; to the special problems of the region about the city; to the problem of city expansion, transportation, and recreation; and to the overlapping governmental units which complicate the problem. Since four counties in southeastern Wisconsin have absorbed half of the increase of the state's population in the last thirty years, special attention is given to the urbanization and land use problems of this area.

Property Insurance, see page 48.

SECRETARIAL TRAINING

‡714. Secretarial Training.

The duties required of a secretary to the business man and the professional man are outlined. Instruction is given in the performance of such duties, together with practical problems selected to train the student in the basic principles associated with secretarial work. The course is planned to assist stenographers and office workers who desire to advance into secretarial work, and to give secretaries additional experience in handling varied executive duties.

Considerable time is devoted to the subject, the development of an ideal personality. Other subjects studied are: secretarial duties and requirements; secretarial standards in correspondence; composition of simple business letters; use of reference books; indexing and filing; meeting callers and handling business appointments for the executive; itineraries; reports; and graphs.

Shorthand dictation practice is optional.

SPEECH

‡7. Beginning Public Speaking.

This is a practical course to help business and professional men and women in their speaking, both in public and in private. A maximum of platform work is required of each student. The theory offered is applied, immediately, to actual speaking situations. The course is designed to teach the individual to prepare and deliver speeches creditably.

‡9. Parliamentary Practice.

For description, see page 98.

‡707. Advanced Public Speaking.

Course 707 is a continuation of Speech 7. Principles of speech psychology are tested out in class speaking, and each student receives individual guidance in refining his all-round ability as a speaker. Special occasion speeches, such as the introduction, presentation, acceptance, and welcome speech, are also studied.

Prerequisite: An elementary course in Speech, or consent of instructor.

‡710. Radio Speaking.

Lab. fee, $2.25.

This is a practical course designed to give the student a maximum amount of microphone speaking and studio experience. Every student has an opportunity to study and practice radio announcing, studio directing, script-writing, and script-reading. Original programs are prepared, rehearsed, and broadcast. Each student makes two records, which become his property.

Prerequisite: An elementary course in Speech, or consent of instructor.

For other courses in Speech, see page 98.

STATISTICS

‡139. Business Statistics.

The principal objective of this course is to develop the student's ability to undertake the statistical analysis of a business problem. The topics discussed include: sources of business information; classification and tabulation; charting; and the preparation and interpretation of statistical reports. The major portion of the time is spent in a study of the various methods of graphical presentation.

ENGINEERING AND TECHNICAL SUBJECTS

William J. Fuller, B.A., Professor of Civil and Structural Engineering, Chairman

Harry T. Avey, M.E., Associate Professor of Mechanical Engineering; in charge of Mechanics and Machine Design

Herbert W. Wesle, B.S., Associate Professor of Topographic Engineering; in charge of Railway and Topographic Engineering Courses

Leo S. Baldwin, B.A., B.S., Assistant Professor of Drawing; in charge of Drawing Courses

C. L. Dean, B.S., Assistant Professor of Mechanical Engineering (Madison and Milwaukee)

Hiram E. Grant, B.S., Instructor in Mechanical Drawing

Part-Time

E. A. Abendroth, B.S., Instructor in Structural Engineering

R. O. Bernauer, B.S., Instructor in Diesel Engines

Alivin E. Ericson, B.S., Instructor in Radio

Robert D. Junge, E.E., Instructor in Electrical Problems

E. A. Longenecker, B.S., Instructor in Time and Motion Study

Arnold Meyer, B.S., Instructor in Welding

S. A. Mollica, B.S., Instructor in Mechanical Drawing

Burbank Murray, B.S., Instructor in Mechanical Drawing

Rolland D. Nelson, B.S., Instructor in Mechanical Drawing

Carl Oestreich, B.S., Instructor in Civil Engineering

Walther Richter, B.S., Instructor in Electrical Engineering

Norman Schober, B.S., Instructor in Mechanical Drawing

Walter Veenendaal, A.I.A., Instructor in Architectural Drawing

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule, which will be issued each semester.

(*) Indicates university credit.

(‡) Indicates certificate credit.

I. Course given first semester.

II. Course given second semester.

ARCHITECTURAL AND BUILDING

‡1a. Architectural Design.

Design, in so far as it should indicate the character of the building, whether political, religious, or domestic, is taken up in this course. Good design requires grace of form, articulation of parts, proportion and emphasis, these qualities all being dependent upon outline, mass, color, and detail. It comprises the use of both Greek and Roman Periods and the Periods that follow, in conjunction with building design.

‡1b. Architectural Design.

Course 1b is a continuation of the first semester's work. It is open to new students who are properly prepared.

Prerequisite: Course 1a or its equivalent.

‡243a. Architectural Drawing.

Besides dealing with the subject of drawing as applied to architectural work, this course affords much valuable information on details of building construction and architectural practice. The draftsman is given practice in the design of details of a moderate sized house from which he makes drawings. These cover such details as walls of various types, sash, casement, door head, floors, stair sections, fireplaces, heating and plumbing layout.

‡243b. Architectural Drawing.

In the second semester the student is required to make drawings of a small house beginning with sketch plans and elevations at ⅛ inch scale. Special attention is given to the proper presentation of these drawings. Working drawings of plans and elevations are then made at ¼ inch scale followed by ½ inch scale drawings of stairway, fireplace, cabinets, and the full-sized details that are required to complete the house.

Prerequisite: Course 243a or its equivalent.

‡497a. Estimating for Builders.

The practical methods of estimating used by builders and contractors are taught. Instruction is given in the reading of blueprints and designs. Plans for small buildings are furnished, and the student carries through a systematic estimate of all material and labor quantities. He is instructed to use judgment in estimating the quantities of brick, lumber, glass; to make proper allowance for unavoidable waste in construction; to analyze cost data for similar work and arrive at certain unit costs; to make the proper tabulations in order to arrive at the direct cost.

‡497b. Estimating for Builders.

The subject matter of this course is confined to reasonably large buildings of reinforced concrete, steel, and wood. The work of the semester is directed to the preparation of quantity surveys and to the estimate of the labor required for the different types of construction. A complete set of blue prints, together with the specifications of some large buildings in Milwaukee, is acquired by the student.

Prerequisite: Course 497a or its equivalent.

CHEMISTRY

2a. General Chemistry.* I, II. **4 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

This course is designed to offer a broad foundation in the chemical and related sciences. The properties and reactions of non-metals, acids, bases, and salts are studied with special emphasis on the fundamental laws and theories.

2a. General Chemistry.* (Special) I. **4 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

This course is designed especially for chemical engineers who desire technical training in the chemical and related sciences. The properties and reactions of certain metals and non-metals are studied with emphasis on the mathematical application of the fundamental laws and theories.

2b. General Chemistry.* II. **4 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

A study is made of the inorganic chemistry and qualitative analysis of the common elements. Special emphasis is given to the principles underlying the analytical procedures.

Prerequisite: Chemistry 2a.

2b. General Chemistry.* (Special) II. **4 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

This course is intended for chemical engineers. A study is made of the physical and inorganic chemistry of the common metals. The laboratory work consists of Qualitative Analysis that is used to illustrate the properties of some of the compounds of certain of the metals.

14. Quantitative Analysis.* I. **3-5 credits**

Three or four credits, lab. fee and deposit, $17.50; five credits, lab. fee and deposit, $22.50.

Chemistry 14 is a course in the essentials of quantitative analysis. The student analyzes naturally occurring ores and commercial materials.

Prerequisite: General Chemistry, including qualitative analysis.

20 and 21. Organic Chemistry*, see pages 75 and 76.

DRAWING

Architectural Drawing, see page 57.

‡1. Elements of Mechanical Drawing.*I, II. **3 credits**

Laboratory fee, $1.00.

Topics treated: theory of orthographic projection including auxiliary views; reading problems; isometric drawings; freehand sketching; technique of making mechanical drawings; vertical lettering. (Only actual machine parts used as problems.)

‡2. Elements of Mechanical Drawing.* I, II. **3 credits**

Laboratory fee, $1.00.

Topics treated: problems involving the conventional representation of all kinds of threads, springs, fillets, rounds; use of irregular curve; technique of drawing engineering graphs; delineation; thorough study of the form, spacing, selection, location, and decimal limit for dimensioning; sketches of actual machine parts, followed by detail drawings, assembly drawing and tracing; blue printing; design layouts. American Standards Association's conventions and standards used throughout the course. (Only actual machine parts used as problems.)

Prerequisite: Drawing 1 or equivalent in commercial drafting room experience.

(Courses 1 and 2 may be elected for credit by students in the College of Letters and Science.)

3 Descriptive Geometry.* I, II. **3 credits**

Laboratory fee, $.50.

Topics treated: fundamental theory of point, line, and plane, with application to solids; generation of lines and surfaces; tangent planes; sections, intersections, and developments. A large number of the problems used are practical problems in the various fields of engineering, selected so as to correlate the theory with practical applications.

Prerequisite: Drawing 2 or equivalent in commercial drafting room experience.

ELECTRICAL

6a. Vacuum Tubes and Their Industrial Applications. I.

Laboratory fee, $.50.

During the first semester the student learns the fundamentals about vacuum tubes. Knowing the fundamentals, he should be able to design simple control circuits containing vacuum tubes. Many problems are worked out by the student throughout the course.

A knowledge of the fundamental laws governing the flow of electric current is required. Students should also have at least a working knowledge of trigonometry.

6b. Vacuum Tubes and Their Industrial Applications. II.

Among the topics treated are the following: the tubes as detector; plate and grid detection; various types of vacuum tube voltmeters; vacuum tube

wattmeters; the influence of grid current on d.c. amplifiers; photo-cells and their characteristics; amplifiers for photo-cells; the tube as generator of a.c. of any frequency (oscillator); multi-vibrators; tube circuits operating from a.c. lines directly (photo-relays, capacity relays); gaseous tubes; thyratrons and some of their uses; cathode ray tubes and their applications.

213a. Elementary Problems in Electricity.

The course includes electric and magnetic circuits; also a treatment of the more common electrical measuring instruments. Classroom and home study problems are used extensively to make the students familiar with the subject. The course is a problem course in electricity; although a knowledge of the calculus will clarify some of the derivations, it is not necessary.

Prerequisite: Trigonometry and the equivalent of electricity as covered in high school physics.

360. Selected Topics in Electrical Engineering.

This course is offered for electrical engineers. Many who have become specialized in one subject should be interested in obtaining a broader knowledge by studying a number of electrical problems from various fields.

The following is a list of topics covered: Wheatstone bridge and the fallacy of equal resistances in its branches for maximum sensitivity; alternating current bridges; Schering bridge; Anderson bridge; Maxwell method of cyclic currents for bridge and other networks; bridges with non-linear elements and their applications for voltage regulation; power factor; circuits with no reactance, yet having power factor less than unity; alternating current vector diagrams; inversion; the general equation of the circular diagram and some applications of the latter; half- and full-wave rectifier circuits containing inductance and capacity; fundamentals of transients.

It is hoped that the above list will be augmented by problems encountered by members of the class.

Prerequisite: Mathematics, including calculus; knowledge of fundamentals of electrical engineering and of representation of alternating currents by complex quantities.

GEOGRAPHY

Geography 7 and 8 are consecutive introductory courses in geography; together they form a unit of work for one year. They are offered to engineering students desiring a general cultural background of world geography without laboratory training.

7. Regional World Geography: Natural Aspects.* I. **2 credits**

A survey is made of those natural features of the earth which affect its usefulness to man. Climates, land forms, and natural resources are studied from the standpoint of their distribution and of their relation to man's activities. A brief survey follows of the great geographic regions into which the world is divided. The course is open to freshmen.

8. Regional World Geography. Cultural Aspects.* II. **2 credits**

A survey is made of the various regions of the world with special emphasis on their economic development. Those regions most important from a commercial standpoint are treated more fully than districts removed from the channels of the world trade. The course is open to freshmen.

No prerequisite; Geography 7 recommended.

MACHINE DESIGN

1. Machine Design* (Mechanism). I. **4 credits**

Among the topics treated are: motion and velocities, instantaneous centers, relative linear velocities, velocity diagrams, cams, gearing, and belting.

Prerequisite: Mechanical Drawing 1 and 2.

2. Machine Design Practice* II. **1 credit**

This is a short course treating of the practical considerations of machine design. Study is made of the use and application in design of engineering material, formulae, and tabulated data, together with a discussion of factor of safety and allowable stress.

Prerequisite: Machine Design 1.

‡208. Mechanism. I. (Two evenings a week.)

Mechanism is the study of the motion of the parts of a machine and is sometimes called "the geometry of machinery." Only such mechanisms are studied as are of practical application. Mechanics, strength of materials, and machine practice are introduced only so far as is necessary to the thorough understanding of the mechanism studied.

The subjects studied include linkages, cams, gears, belts, wrapping connectors, and intermittent motions.

Since much careful drawing is required in the course, a good set of drawing instruments is necessary.

Prerequisite: Drawing and Algebra and Trigonometry or their equivalent.

‡209a. Machine Design. (Two evenings a week.)

The principles of mechanics, mechanism, and strength of materials in the design of machine parts are studied in this course.

Introducing the subject, such topics as materials, loads, stresses, factor of safety, elastic limit, modulus of elasticity, and moment of inertia are studied. Typical elements of machines used as examples in applying principles are: beams; columns; rivets and riveted joints; screws and bolts; keys; lubricating devices; bearings; belt and rope drives; toothed gearing; friction clutches and brakes; shafting; springs; cylinders; and plates.

Prerequisite: Mechanics 206a and 206b or equivalent.

‡209b. Machine Design. (Two evenings a week.)

The subject matter of the course covers the following general topics: design of shafting under various conditions of loading, concentration of stress in fillets, and fatigue of metals due to varying stresses; strength of

spur, bevel, and worm gears; friction brakes, friction clutches, friction wheels, belt drives, and rope drives; design of machine frames for strength and rigidity; design of flywheels for inertia, capacity, and strength; stresses in thick cylinders; stresses due to force fits; a brief consideration of the static and inertia forces in connection with rotating and reciprocating machine parts; safety engineering in design.

A selection of suitable problems accompanies the above theory.

Prerequisite: Machine Design 209a.

‡212a. Elementary Engineering Problems (algebra and trigonometry) See below.

212b. Advanced Engineering Problems (analytics and calculus) See below.

MATHEMATICS AND ASTRONOMY

‡212a. Elementary Engineering Problems (algebra and trigonometry).

The purpose of this course is twofold:

First, to provide practice in analyzing simple problems of an engineering nature.

Second, to provide the foundation of elementary mathematics required for the solution of such problems.

The mathematics used is elementary algebra, geometry, and trigonometry. The problems for analysis and solution are of the type frequently met in surveying, in machinery operation, in heating and ventilating, in refrigeration, and in the design of simple structures and machines. The importance of the habitual use of clear-cut sketches as the basis of analysis is emphasized. Orderly and accurate written solutions are required. Constant use of the slide rule is an essential of the course.

Prerequisite: Working knowledge of elementary algebra.

212b. Advanced Engineering Problems (analytics and calculus).

This course is planned to meet the needs of draftsmen and designers who desire a reading and working knowledge of mathematics beyond their present foundation of algebra and trigonometry. Almost all familiar handbook formulas in daily use are based on comparatively simple physical laws. In developing these principles and putting them into working form, methods of analysis and reasoning common to higher mathematics are made use of.

It is the purpose of this course to combine the processes of mathematics and the materials of familiar engineering problems in a series of practical procedures from physical principles to handbook formulas.

Prerequisite: Elementary Engineering Problems 212a.

50. Subfreshman Algebra. I. **No credit.**

The topics covered include square root, quadratic surds, solutions of quadratic equations, simultaneous equations involving quadratics, logarithms, progressions, and the binomial theorem. The course is required of all students who do not pass the examination given to all freshman engineers.

51. Elementary Mathematical Analysis.* I, II. **5 credits**

This course is required of all freshmen in engineering. Applicants for admission are required to pass an examination in algebra, given shortly after the opening of the semester.

The course includes: functions; rectangular coordinates and the straight line; the power functions; the circle and the circular functions; ellipse; hyperbola; single and simultaneous equations; permutations and combinations; binomial theorem; progressions. A thorough review is given at the close. The course gives prominence to the fundamental truths of elementary analysis. Graphing is emphasized.

52. Elementary Mathematical Analysis.* I, II. **5 credits.**

Course 52, Elementary Mathematical Analysis, is regularly required of all freshmen in Engineering and is a continuation of Mathematics 51. The course covers: logarithmic and exponential functions with applications; trigonometric equations and the solution of triangles; simple harmonic motion and waves; complex numbers; locus problems; and a brief course in conic sections.

Prerequisite: Mathematics 51.

53. Elementary Mathematical Analysis.* I. **5 credits**

Course 53 is open to all freshmen who have had four semesters of high school algebra and one semester of trigonometry and who have shown special ability in their work. Inasmuch as Mathematics 51 and 52 include approximately a semester's work in algebra and trigonometry, the omission of these subjects in this course makes it possible to cover the remaining subjects of Mathematics 51 and 52 and to prepare the student for the calculus in one semester. In effect, this gives the student five hours for additional electives, which may profitably be used in obtaining a more advanced mathematical training for engineering.

54. Differential and Integral Calculus.* I, II. **4 credits.**

All Engineering sophomores are required to take this course.

Content of course: review of functions and processes taken up in Mathematics 51 and 52; the derivative, its meaning and application; limits; the power function; differentiation of algebraic functions; second derivative applications; infinitesimals; definite integrals; circular functions; inverse circular functions; exponential and logarithmic functions; maxima and minima; polars; integration.

Prerequisites: Mathematics 51 and 52 or their equivalent.

55. Integral Calculus.* I, II. **4 credits.**

This course is required of all sophomore engineers and is a continuation of Mathematics 54.

Content of course: advanced integration; successive integration; center of gravity; moment of inertia; curvature; series; total derivatives; exact differentials and a brief introduction to differential equations.

Prerequisite: Mathematics 51, 52, 54 or their equivalent.

Note: Mathematics 54 and 55 may be taken by Letters and Science students instead of Mathematics 5.

110. Higher Mathematics for Engineers.*

Course 110 is designed primarily for engineers, but it may be taken profitably by anyone who wishes an introduction to the fields of applied mathematics beyond calculus. The course is given in three parts, a, b, and c, each covering one semester's work. Any one of these parts may be taken independently of the others. Day school students are not advised to enter this course unless they plan to take all three units.

Prerequisite: Calculus.

110a. **2 credits.**

Elliptic integrals, solution of equations, determinants and matrices, infinite series.

110b. **2 credits.**

Partial differentiation, Fourier series, line integral, ordinary differential equations.

110c. **2 credits.**

Partial differential equations, vector analysis, probability.

111. Review of Calculus. **No credit.**

Engineers and other persons engaged in technical work often find that they have forgotten many of the elements of the calculus which they learned in college. This course is designed for such persons. It provides a review of the fundamentals of differentiation and integration, and includes the application of these processes to engineering and practical problems. It may be taken with the consent of the instructor by students who have not had a course in the calculus.

112. Differential Equations.* II. **3 credits.**

This course provides a thorough introduction to the study of the solution of the ordinary and partial differential equations. Special attention is paid to the applications of differential equations occurring in engineering, physics, and geometry.

Prerequisite: Calculus.

117. Vector Analysis.* II. **3 credits.**

For description, see page 94.

Astronomy

6. Navigation.* II. **2 credits.**

This course is designed for students who wish an elementary course in practical astronomy or who wish to become familiar with the methods by which the position of a ship at sea is determined. Some of the subjects taken up are: instruments used in navigation; latitude by Polaris; latitude by a meridian altitude of the sun; azimuth; longitude by a time sight of the

sun or a star; the method of Marc St. Hilaire; the line of position; and modern methods in practical navigation.

Prerequisite: Trigonometry.

MECHANICAL AND INDUSTRIAL

‡223a-b. Heating, Ventilating, and Air Conditioning.

This course is offered, primarily, for architects, architectural draftsmen, engineers, contractors, estimators, and others who feel the need of a practical course which will help them to plan, estimate, and install heating and ventilating systems in the various types of buildings. It is, however, of value to anyone interested in heating and ventilating problems.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics and the ability to use simple formulas are required. Much time and work are saved if the student is able to use the slide rule.

The work of the complete course extends through both semesters.

‡222. Refrigeration.

This is an elementary course and is planned for a thorough study of the fundamental principles of refrigeration. For the student who has had no instruction or experience in refrigeration it provides a good foundation for advanced study. The course should also prove interesting to those who feel the need of a review of the fundamental principles of refrigeration.

The work is based on a standard text. Mimeographed material used in the course is supplied by the Extension Division.

The work of the course contains many calculations and, therefore, a good knowledge of elementary mathematics and the ability to use simple formulas are required. If the student can use the slide rule, he can save much time in making the many calculations involved.

231. Fuels and Combustion.

The course in Fuels and Combustion offers instruction on the fundamental principles and practices of burning coals and other fuels effectively and efficiently in the furnaces of factory and industrial power plants, as well as in domestic plants.

The work is of special interest and value to firemen, engineers, superintendents and managers of factory and industrial power plants, to fuel dealers and salesmen (industrial and domestic), to boiler and furnace salesmen (industrial and domestic), to students of power generation and development, and to all those interested in the utilization of fuels.

The course consists of regular class meetings conducted on the lecture and round-table plan with ample time for the discussion of all questions. The regular work is supplemented by the use of slides and films, the distribution of suitable literature, and a class question box.

250a-b. Methods Engineering (Time and Motion Study).

Course 250a is designed primarily for those who are interested in learning to apply the basic laws of motion economy. The fundamental principles

of motion study are presented through classroom discussions together with moving pictures filmed before and after motion study analysis has been made. Emphasis is laid on the distinction between efficiency and final economy. Working formulas are presented to enable the motion study man to determine readily the amount of time and money which may be justified in the improvement of a specific job. The technique of time study is presented as a tool to be used in connection with motion study. Practice is given in timing operations and in computing piece rates. Uses of time study in connection with estimating and the establishment of the most economical dimensional tolerances are stressed. Students are encouraged to present problems for class solution.

Course 250b is a continuation of Methods Engineering 250a given during the first semester. It consists of lectures and class discussions, time and motion study problems, wage payment plans, product and process analysis, economic considerations governing the purchase of equipment, production control, the relation of production quantities to costs, plant layout, materials handling, waste reduction, and other allied phases of industrial engineering work with which the person in charge of production methods should be familiar.

220a. Diesel Engines.

Course 220a is offered especially for those who desire to obtain instruction on the fundamental principles of the modern Diesel engine, as well as an understanding of some of its constructional features and operating problems. Although the course is a beginning one on the subject Diesel engines, prospective students should have a good working knowledge of algebra in order to do the work in a satisfactory manner. Experience in the internal combustion engine field will be given special consideration towards meeting the requirements for entrance. All students should consult the instructor at the first meeting regarding eligibility for the course. In some cases, an entrance examination will be given.

220b. Diesel Engines.

This is a continuation of Course 220a. As in the first semester, special attention is given to the high-speed automotive type. Various designs are studied as to their construction, principles of operation, economic aspects, and as to their applications to trucks, tractors, railtrams, and locomotives.

274a. Metallurgy.

Course 274a is an elementary course to aid apprentices and others in an understanding of this important field. The course is theoretical and includes information on the making, shaping, and treating of metals. Men in any branch of the metal industry should profit by the course. The subjects covered include: iron, steel, cast iron, malleable iron, graphite steels, aluminum, copper, zinc, lead, brasses, and bronzes.

274b. Metallurgy.

Course 274b is a continuation of the work given during the first semester. The various topics already considered are expanded by treating them not only

in greater detail but also by showing the relationship in metallic alloys as a whole. With the approval of the instructor, students properly prepared may take Course 274b without having had Course 274a.

MECHANICS AND MATERIALS

1. Statics.* I. First half semester **3 credits.**
Prerequisite: Physics 51.

2. Dynamics.* II. Second half semester. **2 credits.**
Prerequisite: Mechanics 1, enrollment in or completion of Mathematics 55.

‡206a. Elementary Mechanics. (Statics). (Two evenings a week.)

Through the course in statics the student acquires a knowledge of the fundamental facts and theories as well as the ability to apply this knowledge to practical problems. The course is of value to the shopman, draftsman, and designer. It must be completed before any of the design courses are taken up. The application of forces to cranes, derricks, and trusses is covered both graphically and analytically.

Among the topics treated are: concurrent forces; equilibrium; resultant and components; non-coplanar forces; types of trusses; loadings; and friction.

Prerequisites: Algebra and trigonometry.

‡206b. Elementary Mechanics. (Dynamics and Properties of Materials). (Two evenings a week.)

This is a continuation of Course 206a given in the first semester. The subjects studied in this course are: motion and forces that produce changes in motion; moment of inertia; radius of gyration; work; power; energy; friction; general laws of machines; elasticity and its relation to the strength of beams, columns, and shafts. Consideration of all these subjects as they arise in different aspects in design is given in the solution of many practical problems.

Prerequisite: Course 206a or equivalent.

‡207. Strength of Materials. II. (Two evenings a week.)

Course 207 is intended for those who aspire to be machine designers or structural or architectural draftsmen. The student should have a good working knowledge of arithmetic, elementary algebra, and the rudiments of trigonometry. He should be familiar with the use of the slide rule and have one of the standard steel handbooks for reference.

Topics treated: properties of materials; simple stresses; elastic properties; cylinders, pipes, and riveted joints; center of gravity and moment of inertia; beams, reactions; shear; bending moments; columns; general reference tables.

Prerequisite: Elementary Mechanics 206a.

PHYSICS AND RADIO

51. General Physics.* I. **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

Mechanics, heat, magnetism, and static electricity are taken up in this course. The course is required of civil, mechanical, and chemical engineers.

Prerequisite: Students must have completed or be taking Mathematics 52.

52. General Physics.* II. **5 credits.**

Two hours lecture-recitation; two hours quiz; four years laboratory. Lab. fee, $7.

Current electricity, sound, and light are treated in this course. The course is required of civil, mechanical, and chemical engineers.

Prerequisite: Physics 51 and Mathematics 54 or concurrent registration in Mathematics 54.

119. Radiation, Ultraviolet to Infrared.*

For description, see page 95.

Radio

1. Principles of Radio Communication.

Dealing with the simplest fundamentals of electricity and magnetism, this course serves as an excellent review for former students of electricity, and provides a foundation for those beginning the study of radio. The subjects given special attention in this course are: electrons; Ohm's law; series and parallel circuits; power and energy; measurement of resistance; theory of motors and generators; batteries; inductance; transformers; coupled circuits; capacitance and its measurement; instantaneous, average, and effective values of current and voltage; phase relation between current and voltage; vector diagrams; capacitive and inductive reactance; impedance; series and parallel circuits; power factor; resonance; properties of coils and condensers in radio use; and high low and band pass filters.

2. Principles of Radio Communication.

Vacuum tubes and their applications are studied in this course. A good knowledge of D.C. and A.C. theory on the part of the student is required. The theoretical consideration of the following topics is thorough but without reference to actual commercial circuits or applications: properties of filaments and cathodes; electron emission; 2, 3, 4, 5, 6 element tube; class A, B, C amplifiers; dynamic characteristics of tubes; undistorted output; power supplies for vacuum tubes; oscillators; detectors; magnatrons, thyratrons, and a consideration of elementary types of receivers—regenerative, tubed radio frequency neutralized, superregenerative, hetrodyne, superhetrodyne, and reflex.

Time is given to a consideration of circuits of the following commercial equipment and applications: transmitters (code, radiophone, broadcast, and airplane); broadcast and commercial receivers and special circuit variations in various manufactured equipment. There is opportunity at each meeting

to discuss problems and topics pertaining to Federal Radio Communication Examinations.

9. International Morse Code.

Drill in sending and receiving and training in message forms and "Q" signals are given in this course. Traffic handling and government regulations are also discussed.

The work of the class is so organized that both beginners and advanced students can get training in receiving at various speeds.

RAILWAY ENGINEERING

1. Railway Curves.* I. **2 credits.**

The computation and field location of simple, compound, and spiral curves, and of railway turnouts are covered in this course.

Prerequisite: Trigonometry and Elementary Surveying.

2. Route Surveying.* I. **3 credits**

The following topics are treated in this course: principles underlying the location of railways, highways, canals, and pipe lines; alignment, including locating of grade contour; gradient, including vertical curves; estimates, including earthwork computations and mass curve.

Prerequisite: Course 1 or concurrent registration.

SPEECH

8a. Extempore Speaking.* I. **2 credits.**

Speech 8a is an elementary course specifically outlined for freshman engineers. It is required of electrical engineers. The course offers a maximum amount of practice in effective organization and presentation of speech material. Emphasis is placed upon gaining freedom of expression and achieving power to think before an audience. A detailed study is made of the speaker, audience, material, and the importance of speaking for a definite purpose.

8b. Extempore Speaking.* II. **2 credits.**

Speech 8b is a continuation of Speech 8a. It is planned for freshman engineers.

The purpose of the course is to give the student increased proficiency in the organization and expression of thought. The speech projects consist of a detailed study and presentation of speeches of explanation, action, introduction, presentation, acceptance, welcome, farewell, and response.

Prerequisite: Course 8a.

STRUCTURAL

‡417a. Reinforced Concrete. (Two evenings a week.)

The fundamentals in the design of slabs, beams, and columns are covered in this course. Some of the topics treated are: aggregates; proportioning; design of concrete mixtures; quantities of materials; strength; steel

and concrete in combination; flexure formulas; working stresses; diagonal tension; bond stress; designs of simple beams with tension reinforcement; design of slabs, T-beams, and beams with steel top and bottom; design of columns reinforced with bars only and of columns with both bars and spiral reinforcing.

Prerequisites: Course 206a and 207 or their equivalent.

‡417b. Reinforced Concrete. (Two evenings a week.)

Course 417b, a continuation of Course 417a, applies the theory to the design of various structures. The topics treated are: general types of concrete floors; floor loads; economic considerations; small openings; roofs; columns; bearing walls; retaining walls; window openings; basement walls; stairs; and foundations. Numerous designs are worked out and drawings made.

Prerequisite: Course 417a or equivalent.

‡450a. Structural Theory.

This course is intended for those who have learned the principles of designing in a preliminary structural course such as 207, or have had equivalent training. The student is taught the design and assembly of a complete structure. The course should be of interest to those who wish to obtain their architect's license, or to those who wish to become draftsmen or to improve their ability as draftsmen.

A complete set of plans showing a two-story steel frame factory building is furnished the student. All of the necessary members are shown, but no sizes are noted. As the design progresses, details are made of the various members in accordance with standard shop practice. At the completion of the course, the student is provided with a complete set of notes as a permanent record of this work.

The texts required for the course are the *Handbook of the American Institute of Steel Construction and The Wisconsin State Building Code.*

Prerequisite: Strength of Materials 207.

‡450b. Structural Theory.

Course 450b is a continuation of Course 450a. In this course interest is centered on the various types of truss framed roofs instead of on beam framing. Two complete structures are designed: the first, a garage with a book tile or gypsum roof and brick walls; the second, a sheet-metal warehouse.

The student again receives drawings showing these buildings, and is taught how to design and detail the various members. At the completion of the course, a complete set of notes is provided for the student to supplement his class notes.

The texts for the course are the same as those for Course 450a.

Prerequisite: Structural Theory 450a.

‡450c. Structural Theory.

Instead of working out a complete building design as he did in the previous courses, the student will consider a number of special problems.

These problems include: the design of girders for different loadings; the design of truss and girder splices; eccentric connections; special end-connections for beams and grillage foundations. Shop drawings are made in each case. The textbooks are the same as those required for Course 450a.

‡450d. Structural Theory.

This course, like Course 450c, consists of a number of special problems. These problems include: coal hoppers, water tanks; hip and valley details; wind brackets and bents; towers and columns under eccentric loads. The student is required to make complete designs of the different structures as well as the necessary shop drawings. Textbooks are the same as those required for Course 450a.

452. Continuous Frames.

This course deals primarily with the theory of continuous frames with special reference to building construction. The requirement for admission is a general knowledge of the design of simple structures and of reinforced concrete members.

The course includes: the development of the fundamental theory of continuity; simple problems to give facility in the application of the theory; the design of the structural framework of a reinforced concrete building.

276a. Welding Design and Practice.

Course 276a is intended primarily for men supervising, inspecting, or designing welded joints or connections. It should, however, prove of value to welding operators or others who have an interest in welding.

276b. Welding Design and Practice.

Among the subjects discussed are: building codes, bridge codes, and vessel codes. The following subjects as related to welding are also covered: structural steel design, the reinforcing of structural steel structures already in use, and the design of machine elements. The student is required to solve numerous problems. Students who are qualified may take this course without having had Course 276a.

Prerequisite: Strength of Materials.

SURVEYING, SEE TOPOGRAPHIC ENGINEERING

TOPOGRAPHIC ENGINEERING

(See Also Railway Engineering, page 69)

1. Elementary Survey.* I. **2 credits.**

Lab. fee, $4.50.

The theory and practice of pacing, taping, and leveling are studied in this course.

2. Elementary Surveying.* II. **2 credits.**

Lab. fee, $4.50.

Classroom work and field practice in the use and adjustment of the engineer's levels, surveyor's compass, and transit are dealt with in this course.

Prerequisite: Course 1.

3. Land Surveying.* I. **3 credits.**

Lab. fee, $3.

Content of course: theory and field practice in the use of transit, sextant, and plane table, in problems relating to land surveying; the effect of lack of adjustments; instrumental inaccuracies and their elimination; methods used in original land surveys, city surveys, and resurveys. The field work is followed by office practice in computations arising from common surveying problems, in plotting field notes, and in making maps.

Prerequisites: Course 2 and Trigonometry.

104. Advanced Surveying.* II. **3 credits.**

Lab. fee, $4.50.

The following topics are taken up: mining, topographic, and hydrographic surveying, stream gaging, and field astronomy; field practice in solar and stellar observations, topographic surveying, and mapping. (Completion of this course admits the student to the University of Wisconsin Summer Survey Camp.)

Prerequisite: Course 3.

108. Short Course in Surveying.* II. **3 credits.**

Lab. fee, $4.50.

This course is planned to meet the needs of students in mechanical and electrical engineering for a general study of surveying. It may also be taken by students in mining engineering and some other courses. It includes topographic, hydrographic, and land surveying, with field practice in the use of tape, level, and transit.

Prerequisite: Trigonometry.

LETTERS AND SCIENCE

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule, which will be issued each semester. Courses marked with an asterisk (*) involve credit toward a university degree. "Sophomore standing" means 25 credits and 25 grade points.

I. Course given first semester.

II. Course given second semester.

BOTANY

Ruth I. Walker, Ph.D., Associate Professor of Botany, Chairman
Merlin L. Hayes, Ph.D., Instructor in Botany and Zoology

The laboratory science requirement may be removed by taking Botany 1 and Botany 2, or Botany 1 and Animal Biology 1, or Animal Biology 1 and Zoology 104. If Botany 1 and Animal Biology 1 are chosen to satisfy the science requirement, either one may precede the other, at the student's discretion.

1. General Botany.* I, II. **5 credits.**

Two hours lecture; two hours quiz; four hours laboratory. Lab. fee, $5.00.

The course in General Botany is preliminary to all advanced work. The general make-up of plants is studied with special emphasis on structure, function, development, and heredity. A survey follows of the plant kingdom illustrated by selected types.

2. Advanced General Botany.* II. **5 credits.**

Two hours lecture; two hours quiz; four hours laboratory. Lab. fee, $5.00

The lectures deal primarily with the history of the development of the scientific spirit in biology and involve a discussion of modern problems of evolution, inheritance, and variation. The laboratory work of the course is a comprehensive survey of the plant kingdom and includes the use of keys in the identification of many plants. In the late spring, laboratory work is done in the field.

Prerequisite: Botany 1.

130. Identification and Classification of Seed Plants.* II. **3 or 4 credits.**

Two hours lecture-quiz; 4 hours laboratory. Lab. fee, $3.00.

This course consists of a study of the local flora, giving training in identification and classification of higher plants. Field trips for the purpose of collecting and identifying herbaceous and woody plants are held in the late spring.

Prerequisite: Botany 1.

CHEMISTRY

George G. Town, Ph.D., Professor of Chemistry, Chairman
Paul E. Millington, Ph.D., Associate Professor of Chemistry
Victor A. Reinders, Ph.D., Assistant Professor of Chemistry
Harold H. Snyder, B.S., Instructor in Chemistry
Donald Swalheim, M.S., Instructor in Chemistry
EuGene Wilda, B.S., Instructor in Chemistry

1a. General Chemistry.* I, II. **5 credits.**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

The course in general inorganic chemistry begins with the study of non-metals and of the fundamental principles of chemistry.

The topics covered are: common elements; oxygen; water; hydrochloric acid; chlorine; chemical theories and laws; chemical equations and calculations; ozone; hydrogen peroxide; the halogens; acids; bases; salts; the atmosphere; ammonia and other nitrogen compounds; nitric acid; sulphur and sulphuric acid; carbon and carbon compounds; hydrocarbons and their derivatives.

In the laboratory, the important non-metals are studied. Attention is given to bleaching agents; common acids of commercial value; ammonia and other common bases; neutralization; purification of water; fuel gases and important by-products of coal gas.

1a. General Chemistry.* (Special) I. **5 credits.**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

This course is designed especially for Chemistry Course (B.S.) students in order to develop technical training in the chemical and related sciences. The properties and reactions of certain metals and non-metals are studied with special emphasis on the mathematical application of the fundamental laws and theories.

1b. General Chemistry and Qualitative Analysis.* II **5 credits.**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

A study is made of the inorganic chemistry and qualitative analysis of the common elements. Special emphasis is given to the principles underlying the analytical procedures.

Prerequisite: Chemistry 1a.

1b. General Chemistry.* (Special) II. **5 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

This course is intended for Chemistry Course (B.S.) students. A study is made of the physical and inorganic chemistry of the common metals. The laboratory work consists of qualitative analysis that is used to illustrate the properties of some of the compounds of certain of the metals.

3. Qualitative Analysis.* II. **1 credit.**

One hour lecture-quiz; two hours laboratory. Lab. fee and deposit, $2.50.

This course is intended to supply more extended training in qualitative analysis than is included in Chemistry 1b or 2b. It is required of all students in the Chemistry Course who are working for a B.S. degree. It is recommended for all students whose courses require additional training in chemistry.

Prerequisite: Concurrent registration in Chemistry 1b or 2b.

11. Quantitative Analysis.* Yr. **3-5 credits.**

Three or four credits, lab. fee and deposit, $17.50; five credits, lab. fee and deposit, $22.50.

Chemistry 11 is a course in the essentials of quantitative analysis. The student analyzes naturally occurring ores and commercial materials.

Prerequisite: General Chemistry, including qualitative analysis.

17. Elementary Chemistry.* **4 credits.**

Three hours lecture; two hours laboratory. Lab. fee and deposit, $6.00.

The general purpose of this course is to familiarize the student with the philosophy of chemistry and its relation to the complex civilization in which we are living. Rather than give the student a transient command of a restricted amount of factual material, this course endeavors to organize and explain the relationships between the phenomena that are concerned with the changes in matter, as these phenomena affect our daily lives. Special emphasis is placed on the modern scientific method of acquiring knowledge about the material universe. The course is intended for those students who are interested in chemistry for its cultural value, and it can not be used as a substitute for Chemistry 1a and 2a. It is not open to those students who have had any previous training in chemistry. If no credit is desired, the laboratory work may be omitted.

20a. Organic Chemistry.* I. **2 credits.**

Two hours lecture; one hour quiz.

The course covers the chemistry of paraffin and unsaturated hydrocarbons, alkyl halides, polyhalogen compounds, alcohols, organic acids and their anhydrides, acyl chlorides, esters, ethers, aldehydes, ketones, organic compounds of sulfur, amines, amides, nitro-paraffins, cyanogen and its related compounds, together with an introduction to stereoisomerism and tautomerism.

Chemistry 20a and 21a should be taken concurrently.

Prerequisite: Chemistry 1b or 2b, or equivalent.

20b. Organic Chemistry.* II. **2 credits.**

Two hours lecture; one hour quiz.

Chemistry 20b is a continuation of Chemistry 20a, covering aromatic hydrocarbons, their derivatives, amino acids, proteins, sugars, starch, cellulose, cellulose derivatives, heterocyclic compounds, synthetic drugs, and alkaloids.

Throughout both courses considerable emphasis is placed upon physiological applications of organic compounds.

Chemistry 20b and 21b should be taken concurrently.

Prerequisite: Chemistry 20a or its equivalent.

21a. Organic Chemistry.* I. **2 credits.**

Six hours laboratory; lab. fee and deposit, $17.50.

This course includes the preparation and purification of a number of representative and important aliphatic compounds, including ethyl bromide, ether, acetic anhydride, ethyl acetate, soaps, fatty acids, acetone, acetaldehyde, methyl amine, and acetonitride. The principles and technique involved in the various processes are stressed.

Prerequisite: Chemistry 20a or its equivalent, or concurrent registration in Chemistry 20a.

21b. Organic Chemistry.* II. **2 credits.**

Six hours laboratory; lab. fee and deposit, $17.50.

Chemistry 21b continues with the more difficult preparation of the benzene derivatives and includes dyes, dye intermediates, aromatic alcohols, aldehydes, and ketones. Considerable attention is devoted to the properties of and the tests for proteins, sugars, and starches.

Prerequisite: Chemistry 20b and 21a, or their equivalents, or concurrent registration in Chemistry 20b.

117. Inorganic Preparations.* **2-5 credits.**

Two credits, lab. fee and deposit, $12.50; $4.50 per additional credit.

This course covers the fundamental principles of chemical manipulation and advanced general chemistry. The experimental work done gives the student:

First A grasp of the fundamental principles on which chemistry is based;

Second An understanding of the various types of reactions employed in inorganic chemistry;

Third A knowledge of the chemistry of the important types of inorganic compounds;

Fourth Greater familiarity with laboratory technique and apparatus. The discussions and reports familiarize the student with the literature of inorganic and physical chemistry and assist him in expressing his findings clearly and concisely.

Prerequisite: 1a and 1b or 2a and 2b.

COMMERCE

James H. March, B.A., M.B.A., C.P.A., Assistant Professor of Accounting (Madison and Milwaukee)

Accounting

8. Elements of Accounting.* I. **3 credits.**

Lab. fee, $1.50.

Course 8 takes up the principles of double-entry bookkeeping; the use of fundamental books; the treatment of and proper statements for sole proprietorship, partnership, and corporation accounts.

Prerequisite: Sophomore standing.

In the College of Letters and Science this course may be counted as part of the credits required for graduation only by the students in the School of Commerce.

9. Intermediate Accounting.* II. **4 credits.**

Lab. fee, $2.50.

The theories of general accounting with problems to illustrate their application are first considered. Particular attention is given to the preparation and analysis of profit and loss statements and balance sheets.

Prerequisite: Commerce 8 and Mathematics 7.

DRAWING, see page 59.

ECONOMICS

M. R. Schnaitter, M.A., Associate Professor of Economics, Chairman

H. R. Doering, B.A., M.B.A., Assistant Professor of Business Administration

1a. General Economics.* I. **4 credits.**

This course is designed to acquaint the student with the basic characteristics of our modern economic organization. A brief introduction compares our present system with earlier ones, showing how our industrial organization has developed. A study is made of the organization, management, and financial control of corporations and other types of business concerns. Large scale enterprise, corporate securities, and industrial combinations are studied. Labor organization and policies and industrial conflict are examined. Other important subjects covered include money, credit, banking, speculation, insurance, international trade, foreign exchange, and transportation problems.

Prerequisite: Full sophomore standing (25 credits and 25 grade points).

1b. General Economics.* II. **4 credits.**

The first part of this course deals with the factors which determine wages, rent, interest, and profits in the business world. Following this comes a study of the causes and effects of business cycles and price changes. The personal distribution of wealth and income is also examined in detail. Attention is given to consumption and the factors affecting consumption and saving. Consideration is given to the problems in the field of public finance, such as taxation, public expenditures, public loans and debts, and to economic policies such as laissez faire, governmental control, protective tariffs, free trade, and the control of industrial combinations.

Prerequisite: Economics 1a.

EDUCATION, see special bulletin.

ENGLISH AND JOURNALISM

C. W. Thomas, Ph.D., Assistant Professor of English, (Madison) Chairman
John J. Creamer, B.A., LL.B., Associate Professor of English
Mary R. Babcock, M.A., Assistant Professor of English
Elisabeth K. Holmes, M.A., Assistant Professor of English
Frank M. Hursley, M.A., Assistant Professor of English
Dudley C. Brooks, M.A., Instructor in English
R. Felix Morrison, M.A., Instructor in English
Gracia E. Torinus, M.A., Instructor in English
Herbert T. Webster, Ph.D., Instructor in English

1a. Freshman English.* I, II. **3 credits.**

English 1a is required of all freshmen in all colleges of the University. Its aim is to improve the student's skill in speaking and writing standard English. Class work consists of preparation of expository themes, analysis of good modern prose, and collateral reading.

1b. Freshman English.* I, II. **3 credits.**

English 1b, a continuation of English 1a, is required of all freshmen except those who earned a grade of "A" in English 1a. Students who are taking technical subjects are instructed in the methods of research and of technical report writing in their special fields.

Prerequisite: English 1a.

2a. Sophomore Composition.* I. **2 credits.**

English 2a is a course in imaginative composition dealing particularly with descriptive and narrative writing.

Prerequisite: English 1b or a grade of "A" in English 1a.

2b. Sophomore Composition.* II. **2 credits.**

English 2b is a course in expository writing designed to train the student in clear, compact, energetic thinking and writing.

Prerequisite: English 1b or a grade of "A" in English 1a.

30a. Survey of English Literature.* I. **3 credits.**

This course (together with 30b) follows the historical plan of study. The selections assigned for reading and study are linked with lectures on the social and literary background from the beginning until modern times. It is designed for students primarily interested in English literature and is recommended for English Majors and Minors. It fulfills the literature requirement for sophomores who are candidates for the B.A. degree. The semester's work covers the period from Chaucer to Dryden.

Either Courses 30a and 30b or Courses 33a and 33b must be taken as prerequisite for all advanced courses in English literature. A student who has a semester's credit in Course 33 may not elect either semester of Course 30.

Prerequisite: English 1b or a grade of "A" in English 1a.

30b. Survey of English Literature.* II. **3 credits.**

This is the second semester of a year's course in the historical survey of English literature. It follows the same plan as 30a. The semester's work extends from Swift and Defoe up to nearly the present time.

33a. Introduction to English Literature.* I. **2 credits.**

This course is intended for those who wish to increase their appreciation and enjoyment of literature. It is a study of masterpieces in English literature from the sixteenth century to our own time.

English 33a is parallel to English 30a (General Survey) as a prerequisite to advanced courses in English literature. A student who has a semester's credit in Course 30 may not elect either semester of Course 33.

Prerequisite: English 1b or a grade of "A" in English 1a.

33b. Introduction to English Literature.* II. **2 credits.**

Course 33b continues the study of English literature begun in the first semester. Although English 33b is a continuation of 33a, it constitutes a distinct unit in itself and may be taken as such by non-credit students.

English 33b is parallel to English 30b as a prerequisite to advanced courses in English literature.

39. The English Novel.* Yr. **2 credits each semester.**

This is a year course in the study of the English novel. Wide reading in representative English novelists from Defoe to Hardy and Conrad constitutes the bulk of the student's work. The first semester traces the history of the novel to the end of the eighteenth century; the second semester to the beginning of the twentieth century.

Prerequisite: English 30 or 33.

40. American Literature.* Yr. **2 credits each semester.**

The aim of this course is to acquaint the student with representative literature produced in the United States from colonial times down to the present. In addition to tracing the main currents in American thought and culture, the lectures include biographical studies of the more important authors.

This course should be preceded or accompanied by English 30 or 33.

Journalism

1a and 1b. General Survey of Journalism.* **1 credit each semester.**

Practical talks once a week on the character and scope of journalistic work, including a consideration of newspapers, magazines, technical and trade journals, agricultural publications, and advertising, are given. This course is required of freshmen who intend to enter the School of Journalism; it does not count for credit toward graduation from the general courses in Letters and Science.

11. Magazine Writing. **No credit.**

The purpose of this course is to give the student basic training in the preparation and sale of non-fiction material for magazines and newspapers.

The course is definitely realistic in its methods, since the actual sale of the material produced by the members of the class is anticipated.

17. Problems of Magazine Writing. **No credit.**

The purpose of this course is to develop the special abilities of the individuals in the class to meet the needs of particular markets. The course is open to those who have taken the course in Magazine Writing 11 and to others who have the ability to produce marketable non-fiction material.

16. Short Story Writing. **No credit.**

An introduction to the literature of short fiction, training in the writing of fiction, and some attention to publication are taken up in this course. Those who wish to enrich their appreciation of fiction as an art may take the course for literary criticism. Beginners in fiction writing are instructed in the finding and development of material and in the elements of fiction writing. Students who have had at least one story published are given instruction in the problems of marketing.

19. Commercial Journalism. **No credit.**

The object of the course is to start prospective writers on the road to sales.

The subjects include newspaper features, newspaper serials and short stories, trade journal articles, advertising copy and ideas, magazine articles and short features, film scenarios, contests, and radio scripts and ideas.

Each member receives individual criticism and advice.

For other courses in English, see page 46.

FRENCH, see page 89.

GEOGRAPHY

Ira Edwards, Ph.D., Lecturer in Geography (part-time)
Loyal Durand, Jr., Ph.D., Assistant Professor of Geography (Madison)

Geography 5 and 6 are consecutive introductory courses in geography; together they form a unit of work for one year. They are intended primarily for students expecting to enter the School of Commerce, and for those desiring a general cultural background of world geography without laboratory training.

5. Regional World Geography: Natural Aspects.* I. **3 credits**

A survey is made of those natural features of the earth which affect its usefulness to man. Climates, land forms, and natural resources are studied from the standpoint of their distribution and of their relation to man's activities. A brief survey follows of the great geographic regions into which the world is divided. The course is open to freshmen.

6. Regional World Geography: Cultural Aspects.* II. **3 credits.**

A survey is made of the various regions of the world with special emphasis on their economic development. Those regions most important from

a commercial standpoint are treated more fully than districts removed from the channels of world trade. The course is open to freshmen.

No prerequisite; Geography 5 recommended.

101. Geography of Europe.* I. **2 credits.**

Both the geographic regions and the countries of Europe are dealt with in this course. The outstanding landscape characteristics of the major regions are described and interpreted. There are discussions of the regional physical features, climate, resources, human activities, etc. Both the natural divisions of Europe and the political units (countries) are used as bases of discussion. The aim of the course is to provide a general geographic background of the continent.

Prerequisite: Sophomore standing.

128. Conservation of Natural Resources.* I. **2 credits.**

This course deals with the natural resources of the United States—waters, minerals, lands, forests, and wild life—in terms of their character and distribution and with the problems relating to their preservation, utilization, and renewal. Emphasis is placed on current conservation problems of major importance to the people of Wisconsin and to the nation as a whole.

Prerequisite: Sophomore standing or consent of instructor.

GERMAN, see page 86.

HISTORY AND POLITICAL SCIENCE

Hilmar C. Krueger, Ph.D., Associate Professor of History, Chairman (On leave II)
George T. Hunt, Ph.D., Assistant Professor of History (On leave, 1938-39).
Lee E. Lawrence, Ph.D., Instructor in History and Political Science
George E. Mowry, Ph.D., Instructor in History
Ruth G. Reinert, Ph.D., Instructor in History

The introductory courses 1, 2, 5, and 10 are open to freshmen and may be taken by sophomores. They are all year courses. Students selecting one of them as a freshman requirement must take it for **three credits a semester throughout the year**, or a total of six credits. If they take another as an elective, concurrently with or after the completion of the three-credit course, they must take it for only **two** credits a semester, omitting whatever supplementary work is assigned to the three-credit students. Students not registered in the College of Letters and Science may take any of these introductory courses for two or three credits a semester, for one or two semesters.

1a. Medieval History.* (to 1100) I. **2 or 3 credits.**

In this course an attempt is made to show the relationship of the three elements of medieval history: the Graeco-Roman civilization, the Christian church, and the Germanic peoples. The course begins with one element, Rome, already declining; with another, the church, just arising as a political power; and with the Germans, the third element, threatening the Roman frontier. The growth of the church as a cultural and political power forms

one development, the advance of the Germans in government and cultural appreciation forms another.

1b. Medieval History.* (1100-1500) II. **2 or 3 credits.**

The course begins about 1100 and follows closely the work of the medieval people in the crusades, in commerce and industry, and in the town movement. The intellectual life is seen in the founding of the universities and in the studies pursued in them. Medieval literature, Latin and vernacular, is read, and some architecture is viewed. In the political sphere, the nationalism of France and England, the particularism of Germany, and the resultant conflicts with ecclesiastical and baronial powers find their place. The last four weeks of the course are spent on the Renaissance: political and economic changes, painting and sculpture, literature and architecture.

Prerequisite: History 1a or consent of instructor.

2a. Modern European History.* (1492-1815) I, II. **2 or 3 credits.**

The course is a study and an analysis of the chief movements in European History between 1492 and 1815. It begins with the commercial and religious revolutions of the fifteenth and sixteenth centuries and closes with the agricultural, industrial, and political changes of the eighteenth century. A study is made of the governmental and cultural developments of the great states, at times in topical order, at times in biographical sketches. The overseas expansion of the European countries is traced to various parts of the globe—America, Asia, Africa. Special attention is given to the ideas and reforms of the enlightened despots of the eighteenth century, and to the writings and teachings of those who criticized the Old Regime which these despots hoped to continue. The course closes with the victory of the critics, with the French Revolution, and the spread of the revolutionary ideas in the Age of Napoleon.

2b. Modern European History.* (1815 to the present). I, II. **2 or 3 credits.**

In general this course is an analysis of the factors and circumstances leading to the World War and of post-war problems. The efforts of conservatives to preserve the class privileges and dynastic organization of eighteenth century Europe against the growing forces of nationalism and liberalism are described. The peculiar problems of each European state are considered in some detail. Attention is paid to the industrialization of western Europe, the appearance of socialism, the competition for markets, the clash of interests in the Balkans, and the extension of the empires of the various nations. The relation of these factors to the World War is considered. Finally, post-war problems and developments are discussed.

Prerequisite: History 2a or consent of instructor.

5a. English History.* I. **2 or 3 credits.**

Course 5a begins primarily with the Anglo-Saxon invasion and traces the growth of English institutions to the death of Queen Elizabeth. Stress is given to the contributions of the various peoples migrating to England, and comparisons are made with existing institutions in Europe. The course deals with the life of the people, their religion, government, and social and

economic progress. The central theme is to develop an understanding of those factors which aided in the transition of England into a modern state.

5b. English History.* II. **2 or 3 credits.**

This course traces the development of English institutions from the accession of James I to the present. Emphasis is placed upon the rise of responsible government and democracy, the industrial revolution, and commercial expansion of the English people. In this connection, political and economic reforms are studied as an indication of the progress of modern England. The formation of the British Empire and growth of imperialism receive attention, especially in view of British participation in world politics.

Prerequisite: History 5a or consent of instructor.

10a. Ancient History.* (Orient and Greece) I. **2 or 3 credits.**

The first weeks of this course are devoted to the great Oriental centers, Mesopotamia, Egypt, and Persia, and to minor states like Assyria, Chaldea, and Palestine. The greater part of the semester is devoted to the history of the Greeks. The social and legal aspects of Greek life are studied in the development of the Athenian democracy as well as in the camp of the Spartan soldier; and the cultural development and its culmination in the Periclean Age, as seen in the philosophy and religion, literature and art, receive detailed attention. The course ends with the Post-Periclean Age.

10b. Ancient History.* (Hellenistic Age and Rome) II. **2 or 3 credits.**

During the first weeks a study is made of Alexander's conquests and of the results of these conquests.

The last twelve weeks are spent on Rome. Emphasis is placed upon Republican Rome, its expansion over the Mediterranean, its social and economic development, and its ultimate failure. The process of reconstruction in the Empire of Augustus receives considerable attention; the Roman legions are followed to the various parts of the known world, where they built roads and erected temples, aqueducts, and baths, symbols of Roman victory and advance. Some time is spent on the new element, Christianity, as it grows up. The course ends with the "Decline and Fall of the Roman Empire."

Prerequisite: History 10a or consent of instructor.

4a. History of the United States.* I. **3 credits.**

This course traces the development of American nationality from 1763 to 1840. Emphasis is placed on the origin and formation of the national government and those factors which influenced its growth. The gradual evolution of democratic institutions, the emergence of an American spirit, and the social and economic life of the new nation receive consideration.

Prerequisite: Sophomore standing, or a grade of "A" or "B" in two semesters of any freshman history.

4b. History of the United States.* II. **3 credits.**

The emergence of the United States into a world power is the central theme of this course, which extends from 1840 to the present day. Em-

phasis is placed upon the slavery controversy, growth of industry and "Big Business," the rise of organized labor, party politics, and American imperialism. The aim of the course is to develop an understanding of present day America with its complexity of social, economic, and political problems.

Prerequisite: Sophomore standing, or a grade of "A" or "B" in two semesters of any freshman history.

Political Science

7. American Government and Politics (National).* I. **3 credits.**

This course offers an inspection and critical analysis of the chief problems of American national politics. Attention is paid both to functional activities and to the larger issues raised by the efforts of the federal government to deal with the economic crisis. Emphasis is placed upon the social forces which condition or determine governmental forms and actions. It is not open to freshmen.

125. Survey of World Politics.* II. **3 credits.**

Course 125 is an analytical introduction to the foundation of international relations. A survey is made of the factors controlling relations among nations: nationalism; imperialism; and racial, populational, and economic problems. A study is made of the settlement of international disputes by war and by methods other than war. Emphasis is placed upon recent and contemporary foreign policies. Although there is a text, assignments are also made in standard general works, official publications, pamphlets, and periodicals.

Prerequisite: Full sophomore standing (25 credits and 25 grade points).

ITALIAN, see page 90.

LANGUAGE REQUIREMENTS

Candidates for the B.A. degree may meet the requirement in foreign language in one of the following ways:

1. By passing examinations in what is known as the intermediate or reading examination in two languages.

2. By passing what is known as the proficiency examination in one language.

3. By securing 32 credits in one, two, or three languages. These credits may be earned partly in high school and partly in the University, or wholly in the University. High-school work is accepted in satisfaction of the foreign-language requirement at the rate of four university credits for one unit, up to the amount of six units, or 24 university credits. A student is not permitted to repeat in college, for credit, the equivalent of a course in foreign language which he has had in high school. Eight credits is the least amount of a single foreign language which will be accepted toward the foreign-language requirement of any course, and if two or three languages are presented, at least 16 credits

must be in one language. Students choosing a foreign-language major must present a second foreign language.

4. By passing one intermediate test and by presenting 16 credits additionally.

The student who meets the requirement by examination is still required to earn 120 credits for graduation, but no specified number of credits must be earned in foreign language. A student may at the time of entrance, or whenever he feels properly prepared, take either the reading examination in two languages or the proficiency examination in one language. If he passes, he will be exempt from any further language study, so that the credits which he might have been obliged to earn in language may be earned in other subjects. Languages may, of course, be continued as electives.

The reading examination should be within the ability of the average student who has had two years of the languages concerned in college or two years in high school plus one year in college.

The proficiency examination may be attempted by good students who have had the equivalent of three years of college instruction including a course in conversation.

Content of Examinations

The reading examination will test the student's ability to comprehend prose in the foreign language of about the difficulty of texts now used in the fourth semester. He will also be required to translate a passage from the foreign language into good English and to show familiarity with idioms and vocabulary. In addition the student must demonstrate his ability to pronounce the language by reading a passage out loud in the presence of the examiner.

The proficiency examination in addition to testing the ability to comprehend the printed page will test the student's knowledge of literature and history as related to the language involved. There will also be an oral examination to test the student's ability to understand and answer simple questions in the foreign language.

Arrangements for Examinations

For dates of these examinations, see calendar, page 3. The exact time and place will be announced on the bulletin board.

Students planning to take these examinations should consult Dr. Purin for German, Miss Steinfort for Spanish, and Dr. Young for French. Formal application for permission to take the examinations should be made to the Recorder at times to be announced.

Students who fail may take the examination again, whenever offered.

Ph.B. Degree

The language option for the Ph.B. degree may be met either by examination or by credits earned in college.

B.S. Degree in Education

Those students who expect to enter the School of Education at the end of the sophomore year should be prepared to pass attainment examinations for their language requirement.

LANGUAGES

German and Russian

Charles M. Purin, Ph.D., Professor of German and Russian, Chairman
Frieda A. Voigt, M.A., Instructor in German
Robert H. Weidman, Ph.D., Instructor in German

German

1a. First-Semester German.* I, II. **4 credits.**

Training in pronunciation given through oral and aural exercises to insure fluency in reading. A minimum of 500 most frequent words and some 40 of the most frequent idioms to be mastered actively. Essentials of grammar exclusive of the passive voice and the subjunctive. Grammatical topics stressed: declensions, conjugations, case government, and word order. Reading requirements, in English: about 100 pages on Germany and its institutions. Texts read in class: Heath's *Graded German Readers*, Books I-V.

1b. Second-Semester German.* I, II. **4 credits.**

Grammar essentials reviewed. Special topics: subjunctive and passive. Approximately 600 additional most frequent words and about 60 idioms to be mastered actively. Required reading, in English: about 100 pages on German culture and civilization. Heath's *Graded German Readers*, Books VI-X read in class and approximately 100 pages outside.

Prerequisite: German 1a or one year of high school German.

2a. Third-Semester German.* I, II. **4 credits.**

Some 200 pages of narrative and dramatic prose, with oral and written reproduction, read in class, and about 250 pages of intermediate grade outside. An additional 700 of the most frequent words and some 100 idioms to be mastered actively. Types of texts used in class: Bonsel's *Die Biene Maja*, Purin-Rose *Kulturkunde*, Hofrichter-Stroebe *Leicht und Neu.*

Prerequisite: German 1b or two years of high school German.

2b. Fourth-Semester German.* I, II. **4 credits**

Some 300 pages of novelistic literature and lyrics read in class and some 300 pages outside. Additional 800 words in Purin's *Standardized German Vocabulary* to be mastered actively. Composition work based on the texts read. Types of texts used in class: Röseler's *Moderne Erzähler*, Hauptman's *Einsame Menschen*, Keller's *Romeo und Julia auf dem Dorfe.*

Prerequisite: German 2a or three years of high school German.

20. Classical and Modern Writers.* Yr. 3 credits each semester.
Reading, composition, and oral practice. Some 400 pages read in class and an equal amount outside. Types of texts used in class: Grillparzer's *Des Meeres und der Liebe Wellen*, Goethe's *Hermann und Dorothea*, Fleissner's *Der junge Goethe*. Outside reading: Storm's *Der Schimmelreiter*, Mann's *Tonio Kröger*, and Schiller's *Wilhelm Tell* or *Jungfrau von Orleans*.
Prerequisite: German 2a or equivalent.

25. Intermediate Composition and Conversation.* Yr. 2 credits each semester.
Written exercises and grammar review, with discussion in German.
Prerequisite: German 2b.

Russian

1a. First-Semester Russian. I. No credit.
Essentials of grammar with ample oral and written exercises. Text used: A. H. Semeonof, *A New Russian Grammar*.

1b. Second-Semester Russian. II. No credit.
Reading of easy selections and stories, with practice in conversation on content of material read. Text used: A. H. Semeonof's *Grammar* (completed) and *A First Russian Reader* by the same author.

Polish

Szymon St. Deptula, M.A., Instructor in Polish

1a. Elementary Polish.* I. 4 credits.
An introductory course for students with no previous knowledge of Polish.

1b. Second-Semester Polish.* II. 4 credits.
A continuation of Polish 1a.

10a. Intermediate Polish.* I. 3 credits.
Grammar review, oral practice, and written work. Chief emphasis laid on reading fairly difficult Polish prose and poetry. Special vocabulary-building exercises.

10b. Fourth-Semester Polish.* II. 3 credits.
Continuation of the work of Polish 10a.

20a. Advanced Polish.* I. 2 credits
A course for those who understand and read Polish with some degree of ease but who wish to review the fundamentals of Polish grammar and to achieve a speaking mastery of the language. Reading in Prus, Zeromski, and other outstanding prose writers.

20b. Advanced Polish.* II. 2 credits.
A continuation of Polish 20a.

21. Conversational Polish.* I or II. 2 credits.
A practical course that is primarily designed to give the student the opportunity to improve his speaking ability in everyday Polish. No text used.

Course conducted wholly in Polish. Student afforded the maximum opportunity to speak the language since the class is run on the socialized recitation plan.

50. Masterpieces of Polish Literature.* I. **2 credits.**

A survey course which aims to acquaint the student, through lectures, discussion, and extensive reading, with the major masterpieces of Polish literature from the sixteenth century through the first half of the nineteenth. Course conducted in Polish.

51. Modern Polish Literature.* II. **2 credits.**

A sequel to Polish 50 but may be elected independently. Reports, discussion, lectures, and wide reading in Polish literature since 1863, with the emphasis placed upon the key works of representative authors.

60. Polish Literature in English Translation.* I. **1 credit.**

Chief masterpieces of Polish literature from the Renaissance period through the first half of the nineteenth century that are available in good English translations read and discussed. Class conducted in English.

61. Modern Polish Literature in English Translation.* II. **1 credit.**

Representative masterpieces of Polish literature from the second half of the nineteenth century to our time read and discussed.

62. The Polish Short Story in English Translation.* I. **1 credit.**

An introduction to the masters of the Polish short story, most of whom are available in English translation. Comparisons drawn between the European and the American varieties of the short story, both commercial and artistic, with some conclusions as to which is the more effective approach and why.

Two stories read weekly by student. Particular attention paid to the short stories of Sienkiewicz.

63. The Contemporary Polish Short Story in English Translation.* II. 1 credit

With the exception of the stories of Reymont, around which course is organized, all stories the work of living authors dealing with situations and problems that are universal and perennial. Emphasis laid upon the social background of the stories so as to tie up the narrative content with the contemporary scene in Poland.

101. Polish Romantic Literature of the Nineteenth Century.* II. **2 credits.**

A course recommended to prospective teachers of Polish and to students of contemporary romantic literature who read Polish with ease and wish to become acquainted with the chief poetic and dramatic works of Mickiewicz, Slowacki, and Krasinski.

102. Sienkiewicz.* I. **2 credits.**

Wide reading in the representative short stories and novels of Henryk Sienkiewicz, the world-famous author of **Quo Vadis?**, awarded the Nobel Prize in Literature in 1905.

103. Reymont.* II. **2 credits.**

Extensive reading in the representative prose fiction of Ladislas St. Reymont, author of *The Peasants*, who was awarded the Nobel Prize in 1924.

Romance Languages

Charles E. Young, Ph. D., Professor of Romance Languages, Chairman
Meta M. Steinfort, M.A., Associate Professor of Spanish
Florence C. Stehn, M.A., Assistant Professor of French
Robert Roeming, M.A., Instructor in French and Italian
Ruth A. Miller, M.A., Instructor in Spanish (part-time)
Gertrude K. Stoessel, B.S., Instructor in French (part-time)

French

1a. First-Semester French.* I, II. **4 credits.**

The primary object of this course is to teach the student to read simple French prose as a foundation skill to which other skills such as speaking, understanding, and writing may be added later. Grammar is presented from the recognition or French-English point of view. The book also includes the acquisition of a vocabulary of 500 words based on the Vander Beke work count, selected idioms from the Cheydleur list occurring in the texts read, pronunciation, ear training.

1b. Second-Semester French.* I, II. **4 credits.**

The work of the preceding semester is continued with review of grammar, an additional 500 word vocabulary, continued study of idioms, the writing of simple French, oral and aural practice. Attention is given to the culture of the French people.

Prerequisite: French 1a or one year of high school French.

10a. Third-Semester French.* I, II. **3 credits.**

The primary object of the course is to increase the reading ability acquired in the first year. The vocabulary of French 1a and 1b is reviewed, and the study of idioms based on the Cheydleur list is continued. There is also a review of irregular verbs and pronunciations. Grammar is reviewed and studied in connection with the texts read and as contributing to their better understanding. Opportunity is afforded for oral and aural practice. Students who expect to benefit most from the course are given an opportunity to do out-of-class reading.

Prerequisite: French 1b or two years of high school French.

10b. Fourth-Semester French.* I, II. **3 credits.**

French 10b continues the work of Course 10a. Vocabulary study is continued with a second list consisting of 1000 words based on the Vander Beke word count. Attention is given to the literary aspects of the works read with a view toward establishing an appreciation of French literature.

Prerequisite: French 10a or three years of high school French.

15a. Elementary Composition and Conversation.* I. **2 credits.**

This is a supplementary course to be taken with French 10a. It is not open to students who have had the equivalent of two years of college French, except by special permission.

15b. Elementary Composition and Conversation.* II. **2 credits.**

This is a continuation of Course 15a. It is open to properly qualified new students.

21a. Elementary Survey.* I. **3 credits.**

French 21a is a third year course planned to cover French literature in outline, with illustrative readings from the principal periods, movements, and writers. The course includes a study of the literary aspects of the works read, and literary history. This course or its equivalent is prerequisite to all advanced courses in French literature.

Prerequisite: French 10a and French 10b or four years of high school French.

21b. Elementary Survey.* II. **3 credits.**

This course is a continuation of Course 21a. It is open to properly qualified new students.

Italian

1a. First-Semester Italian.* I. **4 credits.**

This is an introductory course for students who have not studied Italian previously. Attention is given to the acquisition of correct pronunciation and fluency in oral reading. The essentials of grammatical structure are taught by means of written and oral practice. Selections for reading of progressing difficulty, which serve as an introduction to Italian culture, are correlated with the study of the grammar. In addition, the mastery of selected idioms and of a vocabulary of at least 500 most frequent words, compiled from recognized word lists, is included.

1b. Second-Semester Italian.* II. **4 credits.**

Course 1b continues the work of the first semester in reading and in vocabulary-building. An additional 500 basic words and selected idioms is mastered. The essentials of grammatical structure are reviewed with emphasis on the writing of simple Italian and on oral practice.

Prerequisite: Italian 1a or equivalent.

Spanish

1a. First-Semester Spanish.* I. **4 credits.**

Spanish 1a includes careful training in pronunciation, much oral and aural practice, a study of the fundamentals of grammar, and the acquisition of a vocabulary of at least 500 words used in the oral work and reading and checked with the Spanish word and idiom lists. The reading of simple Spanish is started early in the semester. In addition, students are required to do out-

side reading in English on the history, life, and customs of the Spanish and Latin-American peoples.

1b. Second-Semester Spanish.* II. **4 credits.**

Spanish 1b continues the practice in pronunciation and oral work, the study of grammar, and the acquisition of basic vocabulary and idioms. The reading of Spanish in class is supplemented by easy readings in the foreign language outside of class.

Prerequisite: Spanish 1a or one year of high school Spanish.

10a. Third-Semester Spanish.* I. **3 credits.**

Spanish 10a continues the study of the Spanish people through the reading of a number of novels, short stories, and plays by the best modern authors. Oral and written work is based on the reading. There is a review of grammar with additional finer points in syntax; also a further study of vocabulary and idioms.

Prerequisite: Spanish 1b or two years of high school Spanish.

10b. Fourth-Semester Spanish.* II. **3 credits.**

Spanish 10b is a continuation of the work of Course 10a with an increase in the amount and degree of difficulty of reading. More extensive oral and written reproduction of content in Spanish is required.

Prerequisite: Spanish 10a or three years of high school Spanish.

20a. Elementary Conversation and Composition.* I. **2 credits.**

This is a supplementary course to be taken with Spanish 10. It is not open to students who have had the equivalent of two years of college Spanish, except by special permission.

Prerequisite: Spanish 1b or equivalent.

20b. Elementary Conversation and Composition.* II. **2 credits.**

This is a continuation of Course 20a. It is open to properly qualified new students.

Prerequisite: Spanish 20a.

21a. Elementary Survey.* I. **3 credits.**

Spanish 21 comprises a brief study of the history and the development of all types of Spanish literature—the epic, the drama, prose writings, lyrics, the novel—covering the centuries from 1140 to the present. This study is centered around and illustrated by the reading and interpretation of representative works of each type.

Prerequisite: Spanish 10b or equivalent.

21b. Elementary Survey.* II. **3 credits.**

This is a continuation of Course 21a. It is open to properly qualified new students.

MATHEMATICS AND ASTRONOMY

George A. Parkinson, Ph.D., Associate Professor of Mathematics, Chairman
William E. Roth, Ph.D., Associate Professor of Mathematics
Ross H. Bardell, Ph.D., Assistant Professor of Mathematics
Morris Marden, Ph.D., Assistant Professor of Mathematics
Louise A. Wolf, Ph.D., Assistant Professor of Mathematics
Allison B. McCain, B.A., Instructor in Mathematics (part-time)
John I. Vass, Ph.D., Instructor in Mathematics
Howard Zoerb, B.S., Instructor in Mathematics (part-time)

The courses of the department are organized with the needs of three types of students in mind:

(1) Those interested in obtaining mathematical training for use in a future profession.

A good mathematical training is essential for all branches of engineering work; for physics, astronomy, chemistry, biometrics and ballistics, and for actuarial (insurance) and statistical work. It is also highly desirable as part of one's preparation for philosophy, or for the biological and social sciences.

(2) Those interested in mathematics from a cultural point of view.

This type includes those attracted to the subject by the importance, beauty, and interest of its material, as well as those who wish to become acquainted with the mathematical mode of thought. This mode of thought, which is fundamental for the exact sciences, is being employed to an increasingly greater degree in other fields of human endeavor.

(3) Those who wish to specialize in mathematics.

For all these students the department recommends the study of analytic geometry (Mathematics 2 or 3) followed by the calculus (Mathematics 5a and 5b or 54 and 55) as a minimum introduction to modern mathematics. Mathematics 2 and 3 are open to students who have had four semesters of algebra in high school, or three semesters of algebra and Mathematics 31, or two semesters of algebra and Mathematics 1.

For the first two types of students the department suggests the further study of Mathematics 110, 112, or 117 and for the last two types Mathematics 6, 101, 103, and 119. Mathematics 6 is a required course for majors in Mathematics. Mathematics 112 is required for majors in physics-mathematics.

1. College Algebra.* I, II. **4 credits.**

This course presents the principle of function, graphing, the solving of equations of higher degree and systems of simultaneous equations, the theory and use of logarithms, and the derivations and applications of algebraic formulas.

Prerequisite: One year of high school algebra.

31. College Algebra.* I, II. **4 credits.**

In addition to the topics in Mathematics 1, this course takes up probabilities, permutations and combinations, inequalities, ratio and proportion, variation, and determinants.

Prerequisite: Three semesters of high school algebra.

2. Trigonometry and Analytic Geometry.* I, II. **4 credits.**

About a third of this course is devoted to the study of the trigonometric functions which are important not only in determining the exact relations among the sides and angles of a triangle, but also in describing quantitatively all sorts of periodic phenomena in nature. Trigonometry is also needed for many branches of higher mathematics including analytic geometry.

The remainder of the course is the same as Mathematics 3.

Prerequisite: Four semesters of high school algebra or Mathematics 1 or 31.

3. Analytic Geometry.* I, II. **3 credits.**

Analytic geometry is the study of geometrical problems by algebraic methods and of algebraic problems by geometric methods. In addition to the straight line and circle, the curves studied in detail are the ellipse, parabola, and hyperbola.

Prerequisite: Same as for Mathematics 2, with the addition of trigonometry.

5a. Differential Calculus.* I, II. **3 credits.**

All majors and minors in mathematics and in the physical sciences are required to take calculus for one year. Letters and Science students may meet this requirement by taking Mathematics 5a and 5b or 54 and 55.

Prerequisite: Mathematics 2 or 3.

5b. Integral Calculus.* I, II. **3 credits.**

Prerequisite: Mathematics 5a.

For Courses 51, 52, 54, and 55, which are open to Letters and Science students, see page 63.

6. Determinants and Analytic Geometry of Space.* II. **3 credits.**

This course extends the methods of plane analytic geometry to surfaces and curves in space. The theory of determinants is developed and is used freely throughout. Majors in mathematics are required to take this course.

Prerequisite: Mathematics 5a or 54; or may be taken simultaneously with 5a or 54.

7. Theory of Investment.* I, II. **4 credits.**

This course is required of all Commerce students and may be chosen as an elective by Letters and Science and Engineering students. The purpose of this course is to provide the student with a thorough mastery of the theory and practice of simple and compound interest and annuities as applied to amortization of debts, sinking funds, depreciation, bonds, and life insurance.

Prerequisite: Mathematics 1 or 31 or 51, or two years of high school algebra.

101. Advanced College Algebra.* Yr. **3 credits each semester.**

Course 101 covers permutations and combinations; interpolation, differences, summation formulae; determinants, matrices, linear dependence, elimination; partial fractions; continued fractions.

Actuaries, engineers, teachers, and others will find this course of special interest.

Prerequisite: Calculus or concurrent registration in Mathematics 5b or 55.

103. Advanced Geometry.* Yr. **3 credits each semester.**

In this course the methods of elementary analytic geometry are extended to the analytic and synthetic projective geometry of the plane. Some of the subjects discussed are: linear equations and linear dependence; homogeneous Cartesian coordinates; harmonic division; line coordinates; cross ratio; transformations; and metric geometry of the complex plane. The principles developed in the early part of the course are applied to rectilinear figures and conic sections.

Prerequisite: Mathematics 6 or consent of instructor.

111. Review of Calculus.

For description, see page 64.

112. Differential Equations.* II. **3 credits.**

Not to be taken by mathematics majors. For description, see page 64.

117. Vector Analysis.* II. **3 credits.**

This course is an introduction to the study of vectors and vector functions with special applications in the fields of geometry, physics, and mechanics. Some of the subjects taken up are: the algebra of vectors including vector and scalar products; differentiation of vectors and vector differential operators.

Prerequisite: Calculus.

119. Introduction to Differential Geometry.* II. **3 credits.**

Course 119 provides an introduction to the differential geometry of space curves, curves and surfaces associated with space curves, and the fundamentals of the theory of curved surfaces. The Vector Method of presentation is used because of its simplicity and effectiveness. Since the necessary vector analysis is presented at the beginning of the course, a previous course in vector analysis is not required. The student should have completed or should be concurrently registered in a course in the analytic geometry of three dimensions. The course is especially recommended for mathematics majors and minors. Other students should obtain the consent of the instructor before registering.

Astronomy

17. Survey of Astronomy.* II. **3 credits.**

The object of this course is to give the student an understanding of the problems which confront the astronomer and of the methods by which these

problems are attacked. Some of the subjects considered are: the optics of the telescope; the solar system; motions and physical properties of the stars; galactic systems. Observational work will be arranged.

The course is open to freshmen.

6 Navigation.* II. **2 credits.**

For description, see page 64.

PHYSICS

Miles J. Martin, Ph.D., Professor of Physics, Chairman
T. Alton Rouse, Ph.D., Assistant Professor of Physics
Earl R. Bell, M.A., Instructor in Physics

1a. General Physics.* I. **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

The following subjects are treated: mechanics, heat, magnetism, and static electricity. The course is open to any Letters and Science student.

1b. General Physics.* II. **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

The following subjects are treated: current electricity, sound, and light. Students entering the second semester who have had high school physics may take this course with the consent of the chairman of the department.

Prerequisite: Physics 1a.

7. Photography.* II. **2 credits.**

One hour lecture-recitation; three hours laboratory. Lab. fee, $4.50.

This course deals with the science of photographic processes. Laboratory work consists of experiments in exposure, developing of negatives, making of prints, enlarging, and other photographic techniques.

Prerequisite: Consent of instructor.

119. Radiation, Ultraviolet to Infrared.* I. **1 credit.**

The course consists of a series of lectures on the physical nature of light with particular reference to ultraviolet, infrared, and X-rays, and their present day applications. The course should be of interest to medical students, nurses, and the general public. It should be of interest to the public because of the increasing role that radiation of all kinds is playing in modern life.

Prerequisite: Physics 1b or equivalent.

POLISH, see page 87.

PSYCHOLOGY

Lynn E. Baker, Ph.D., Instructor in Psychology

1. Introduction to Psychology.* I, II. **3 credits.**

This is an introductory survey of psychology designed to acquaint the student with the basic concepts, laws, and materials useful in the description

of human behavior. The historical and experimental approach is used throughout, covering such subjects as: historical bases of modern psychology, the origins of behavior, intelligence and adjustment, the receptors and sensation, learning, social behavior, and personality development.

Prerequisite: Sophomore standing.

100. Seminar in Problems in General Psychology.* II. **1 credit.**

This is a discussion and reading course in which the student is permitted to follow a line of study which may be of particular interest to him.

Prerequisite: Psychology 1 and instructor's permission.

106. Abnormal Psychology.* I. **3 credits.**

This course in psychology is designed to interpret the normal personality by reference to the psychoneurotic and psychotic patterns. The major clinical forms of psychopathology are covered in addition to such normal phenomena as sleep and dreams, and hypnosis. Therapy is suggested wherever possible.

Prerequisite: Psychology 1, and consent of instructor.

144. Applied Psychology of Learning. I, II. **No credit.**

This is a laboratory course devoted to the establishment of effective study habits. An intensive study is made of principles underlying academic work such as budgeting time, efficient reading, recitation methods, note making, and organization of knowledge. Extensive practice is given in the skills involved.

The course is open to any freshman or sophomore and requires no fee.

Business Psychology, see page 52.

RUSSIAN, see page 87.

SOCIOLOGY AND SOCIAL WORK

Philip H. Person, Ph.D., Associate Professor of Sociology, Chairman
Kimball Young, Ph.D., Professor of Social Psychology (Madison and Milwaukee)

1. Introductory Sociology.* I. Day class—3 credits; Evening class—2 or 3 credits.

This is an introductory course to the study of sociology and is required of students majoring in sociology. The course deals with the environmental, racial, and psychological foundations of society. A study is made of the fundamental social institutions and of how these institutions adapt themselves to the demands of changing conditions of life and living. The lectures, readings, and discussions are planned to make clear the nature of the organization of our social structure and the means by which the members of society are controlled and directed.

Prerequisite: Full sophomore standing. (25 credits and 25 grade points.)

2. Introductory Sociology.* II. Day class—3 credits; Evening class—2 or 3 credits.

This course deals with the nature of social change and the problems of social adjustment; problems of population; eugenics; race relations; prob-

lems of the family; changing status of women and children; social hazards of industrial life; group conflict; war; dependency and correction; problems of socialization. The lectures, readings, and discussions are planned to reveal how the social order is constantly changing and in what direction sound adjustments are tending.

Prerequisite: For sociology majors, Sociology 1; for others, full sophomore standing.

139. Social Psychology.* **2 or 3 credits.**

In our modern world of increasing complexity, human behavior varies directly with increasing participation in a variety of group ideas and social situations.

Social behavior, as related to emotions, habits, fantastical and objective thinking on the one hand, and to prejudice, mental epidemics, propaganda, mobs, crowds, audiences, on the other, is analyzed.

Prerequisites: Psychology 1 and junior standing, or major in sociology.

141. Poverty and Dependency.* I. **2 or 3 credits.**

Course 141 is designed for social investigators, teachers, and others interested in social welfare. The course offers training and credit for those who qualify and are interested in entering the field of social work. The subjects taken up include: the extent of poverty and pauperism; cause of poverty and dependency; historical methods of dealing with dependents; epileptic, dependent children; preventive agencies and methods.

Prerequisites: For Sociology majors, Sociology 1 and 2; for others, junior standing.

160. Marriage and Family in America.* **2 credits.**

The following subjects are covered: the effect of social and economic changes on present-day marriage and functions of the American family; contributions of some of the newer psychological insights into marriage problems; trends in marriage and in family disorganization, and their control.

Prerequisite: For sociology majors, one course in sociology or anthropology; for others, junior standing and consent of instructor.

161. Criminology and Penology.* II. **2 or 3 credits.**

This course deals with crime and criminals: extent, cost, causation, punishment and treatment, institutions, probation and parole, and the courts.

Special attention is given throughout to the problem of juvenile delinquency and its bearing on the problem of crime as a whole.

Prerequisites: For sociology majors, Sociology 1 and 2 or concurrent registration in 2; for others, junior standing.

197. Personality and Social Adjustment.* **2 or 3 credits.**

In this course personality is treated from the angle of group participation, especially in the family, play group, gang, neighborhood, school, church, and various community groups. Literature on problem children, juvenile delinquency, and adolescence is examined critically.

Prerequisites: Psychology 1 or Sociology 139, and junior standing.

144. Contemporary Social Movements in American Life* **2 credits.**

Which of the various social movements of our times such as socialism, labor unionism, fascism, communism, the Cooperative Movement have the most to offer to our present-day society, sorely pressed by change and unrest? It is the purpose of this course to examine these movements critically from all points of view to enable the student to evaluate them better.

Since the Cooperative Movement both here and in foreign countries is in a phase of rapid growth, special attention is given to evaluation of the movement.

This course is substantially equivalent to Sociology (Economics) 144 in residence. Students having had one course may not take the other for credit.

Prerequisites: For sociology majors, Sociology 1 and 2, or senior standing.

163. Population Problems.* **2 credits.**

This course deals with the trends in population growth in numbers, age, and sex classifications and their distribution; the trend of birth and death rates; population pressure; prospects of food supply; conquest of disease; and related topics.

Prerequisite: Senior standing or consent of instructor.

SPANISH, see page 90.

SPEECH

Raymond H. Myers, M.A., Assistant Professor of Speech.

1. Fundamentals of Speech.* I. **3, 2, or 1 credits.**

Lab. fee, $1.00.

For one credit, the lecture course is designed to give the student an understanding of the speech function and the principles of effective speech.

For two credits, the recitations are devoted to practice, analysis of individual performance in speech, and suggestions for improvement.

For three credits, the recitations and lectures are as described above.

Students who expect to take further work in the department should elect Speech 1 in their sophomore year if possible. Not more than three credits may be earned in any combination of Speech 1 and Speech 7, and such combination must include the lecture hour of Speech 1.

Prerequisite: Open to all students except freshmen.

2. Fundamentals of Speech.* II. **3 credits.**

Continuation of Speech 1, which is prerequisite.

7. Public Speaking. I, II. **No credit.**

For description, see page 55.

8. Extempore Speaking.* Yr. **2 credits each semester.**

Required of freshman physical education men. For description, see page 69.

9. Parliamentary Practice.* I. **2 credits (noncredit with permission)**

In this course careful study is made of rules of procedure. There is a maximum amount of actual practice in conducting meetings. Satisfactory completion of the course should enable the student to preside over, or to take an

intelligent part in, any organized meeting.

Prerequisite: Sophomore standing or consent of instructor.

16. Elements of Dramatic Expression and Acting.* I. **2 credits.**

This course treats of the elementary principles of creative dramatic thinking in both the preparation and interpretation of material for the stage. Rhythmics, poise, motion, freedom, control, character analysis, elemental emotions and their portrayal, voice and diction, stage technique, and pantomime are stressed.

Prerequisite: Sophomore standing or consent of instructor.

19. Elementary Dramatic Production.* II. **2 credits.**

This is an elementary course in dramatics designed for those who have had no previous training. The following subjects are studied: choosing the play, choosing the cast, rehearsing, the stage, lighting, scenery, costumes, make-up, and pantomime. The classroom is considered a laboratory in which practice and individual attention are stressed.

Prerequisite: Sophomore standing and consent of instructor.

707. Advanced Public Speaking. I, II. **No credit.**

For description, see page 55.

710. Radio Speaking. I, II. **No credit.**

For description, see page 55.

ZOOLOGY

Joseph G. Baier, Jr., Ph.D., Associate Professor of Zoology, Chairman
Merlin L. Hayes, Ph.D., Instructor in Zoology and Botany

The laboratory science requirement may be removed by taking Animal Biology 1 and Zoology 104, or Animal Biology 1 and Botany 1, or Botany 1 and Botany 2. If Animal Biology 1 and Botany 1 are chosen to satisfy the science requirement, either one may precede the other, at the student's discretion.

1. Animal Biology.* I, II. **5 credits.**

Two hours lecture; two hours quiz; four hours laboratory. Lab. fee, $8.00.

This course is preliminary to all advanced work in Zoology. A study is made of biological principles as illustrated by animals. The cell theory, adaptations, classification, morphology and physiology of organ systems, embryology, heredity, and evolution are considered. The laboratory work includes the anatomy, physiology, embryology, and histology of the frog, and comparative studies on protozoa and hydra.

This course combined with Zoology 104, or with Botany 1, satisfies the natural science requirement.

104. Comparative Anatomy of Vertebrates.* II. **5 credits.**

Three hours lecture; six hours laboratory. Lab. fee, $10.00.

The lectures compare the structure and development of the organ systems in the different vertebrate groups, including physiology wherever

advisable. Special reference is given to the comparison and evolution of the organ systems. The laboratory work includes the dissection of the shark, the mud puppy, and the cat, with comparative references to other vertebrates, including man.

Prerequisite: Animal Biology 1.

Limited enrollment. Students with a grade below C in Zoology 1 not admitted except by permission of the department.

106. Heredity and Eugenics.* I. **2 credits (noncredit by permission)**

Two hours lecture; one hour quiz.

This course includes a comprehensive study of the principles of heredity, their application to man, and their significance in the improvement or deterioration of the human race.

Prerequisite: Sophomore standing, or consent of instructor.

107. Organic Evolution.* II. **2 credits (noncredit by permission).**

Two hours lecture.

This course takes up the field of evidence and the theories supporting organic evolution.

Prerequisite: Sophomore standing, or consent of instructor.

CORRESPONDENCE-STUDY COURSES

The Correspondence-Study Courses offered by the University of Wisconsin, from Madison, provide individual instruction adapted to the special needs of each student. These courses, prepared and conducted by members of the University faculty, may be undertaken in the student's leisure hours at his home. Through them the University and the home are brought into close relationship; and through them also everyone in the state is given an opportunity to obtain the highest education possible at the smallest practical expense. They may be grouped as follows:

Regular university studies, which may be taken for credit toward a degree.

Advanced courses designed to help graduates and others already in professional or practical life to keep in touch with the advancement in science and other fields of knowledge.

High school preparatory studies for those for whom residence study is not available or practical.

Vocational courses which supply knowledge and training in business, industrial, and professional fields.

Elementary and grammar school studies for adults who need such instruction for practical purposes.

Over 400 courses are offered, some of which are listed below:

GENERAL
- Astronomy
- Botany
- Chemistry
- Comparative Literature
- Economics
- Education
- English
- French
- General Science
- Geology and Geography
- German
- Greek
- High School Subjects
- History
- Home Economics
- Italian
- Latin
- Library Methods
- Mathematics
- Music

GENERAL (contd.)
- Pharmacy
- Philosophy
- Physics
- Political Science
- Psychology
- Scandinavian
- Sociology
- Spanish
- Speech

BUSINESS
- Accounting
- Banking and Finance
- English
- Insurance
- Law
- Management
- Marketing
- Real Estate
- Secretarial Training
- Statistics

ENGINEERING
- Aeronautics
- Alternating Currents
- Architectural
- Automotive
- Concrete
- Diesel Engines
- Drafting
- Freehand Lettering
- Heat Power Engineering
- Heating and Ventilating
- Hydraulics
- Machine Design
- Mathematics
- Mechanism
- Radio
- Refrigeration
- Shop Sketching
- Show-Card Writing
- Storage Batteries
- Structures
- Surveying
- Telephony
- Watthour Meters

For detailed information, call at the University Extension Division, The University of Wisconsin, 623 West State Street, Milwaukee, Wisconsin, or telephone Marquette 7051.

Or write to the University Extension Division, the University of Wisconsin, Madison, Wisconsin.

UNIVERSITY OF WISCONSIN
UNIVERSITY EXTENSION DIVISION

DEPARTMENT OF EXTENSION TEACHING offers instruction as follows:

CORRESPONDENCE-STUDY: Courses for adults seeking instruction in elementary and vocational subjects as well as for those in candidacy for university degrees or for keeping abreast after graduation.

CLASS INSTRUCTION: In communities throughout the State where sufficient common interest and demand develop for the formation of classes, conducted during the day and evening.

DEPARTMENT OF DEBATING AND PUBLIC DISCUSSION: Furnishes programs for study groups; loan package libraries; books and other references for correspondence study; general information.

MEDICAL LIBRARY SERVICE: Lends books, reprints, and periodicals—current periodicals lent regularly; package libraries on special subjects.

DEPARTMENT OF PUBLIC SERVICE offers service to groups and individuals in Wisconsin through the following bureaus:

BUREAU OF LECTURES AND SHORT COURSES: Provides for lectures by faculty for community events and commencements; offers cost co-operative lyceum courses and short courses and institutes.

BUREAU OF VISUAL INSTRUCTION: Makes available educational lantern slides and motion picture films to schools, community organizations, associations, and churches.

BUREAU OF ECONOMICS AND SOCIOLOGY: Collects information on social and economic life of Wisconsin; provides information, counsel, and service for groups and communities relative to their social and economic problems.

BUREAU OF DRAMATIC ACTIVITIES: Offers guidance and direction in the writing and production of plays, pageants, and home chautauquas. Field representative available.

BUREAU OF BUSINESS INFORMATION: (In co-operation with the School of Commerce.) Equipped to answer inquiries on a wide variety of business subjects.

(Information and bulletins sent free on request)

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BULLETIN OF
THE UNIVERSITY OF WISCONSIN

THE UNIVERSITY EXTENSION CENTER IN MILWAUKEE

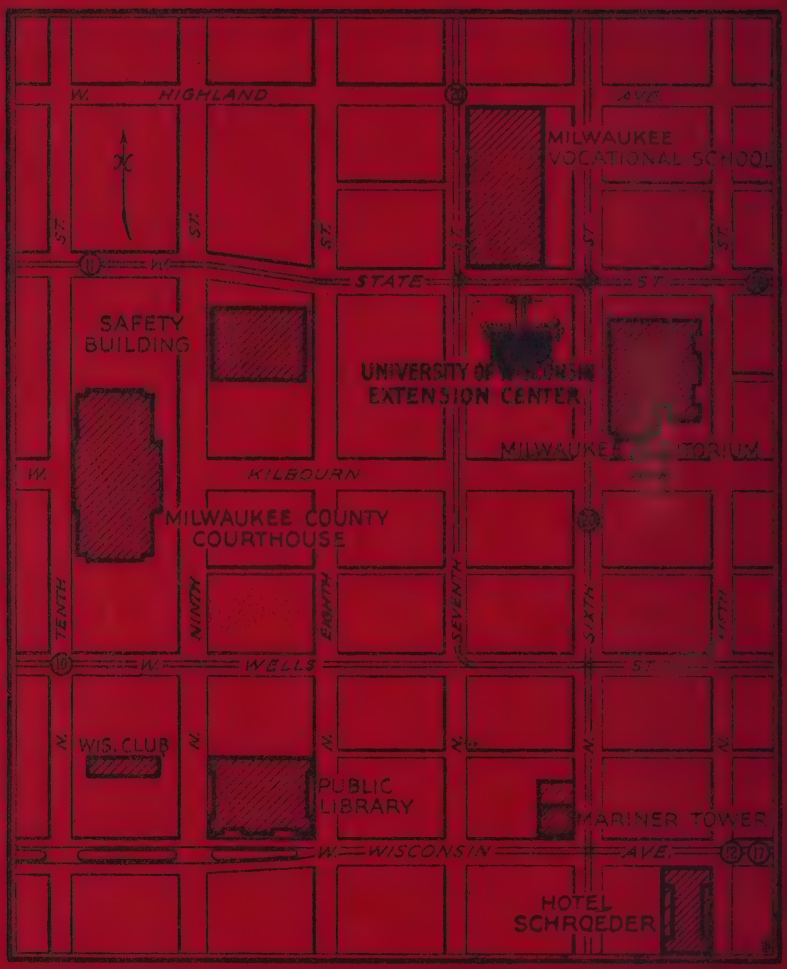
Business

Engineering

Letters and Science

Liberal Education

THE UNIVERSITY OF WISCONSIN
UNIVERSITY EXTENSION DIVISION
623 W. State Street Marquette 7051
Milwaukee, Wisconsin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UNIVERSITY EXTENSION DIVISION
623 W. State Street Marquette 7051
Milwaukee, Wisconsin

BULLETIN OF
THE UNIVERSITY OF WISCONSIN

1939

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JANUARY

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CALENDAR

1939-40

DAY CLASSES

FIRST SEMESTER

September 13, 14	Wednesday, Thursday 9-11 a.m.; 2-4 p.m.	Registration days
September 18	Monday	Instruction begins
September 22	Friday, 12 Noon	Freshman Convocation; attendance required
September 23	Saturday, 9 a.m.	Condition examinations
September 30	Saturday evening	Faculty-student reception
November 30-December 3 incl.		Thanksgiving recess
December 16 (noon)-January 1 incl.		Christmas recess
January 13	Saturday, 9 a.m.	Condition examinations
January 13	Saturday, 2 p.m.	Foreign language attainment examinations
January 22-27 incl.	Monday-Saturday	Final examinations

SECOND SEMESTER

February 1, 2	Thursday, Friday 9-11 a.m.; 2-4 p.m. Old students on Thursday; new students on Friday	Registration days
February 5	Monday	Instruction begins
February 22	Thursday	Washington's birthday; legal holiday
March 16 (noon)-March 24 incl.		Spring recess
April 27	Saturday, 9 a.m.	Condition examinations
May 3	Friday (evening)	Mathematics exhibit
May 11	Saturday, 2 p.m.	Foreign language attainment examinations
May 30	Thursday	Memorial Day; legal holiday
June 3-8 incl.	Monday-Saturday	Final examinations

EVENING CLASSES

FIRST SEMESTER

September 11-16 incl.	Monday-Saturday	Registration days
September 18	Monday	Instruction begins
September 30	Saturday evening	Faculty-student reception
November 30	Thursday	Thanksgiving Day; legal holiday
December 16-January 1 incl.		Christmas recess
January 22-26 incl.	Monday-Friday	Final examinations

SECOND SEMESTER

January 29-Feb. 3 incl.	Monday-Saturday	Registration days
February 5	Monday	Instruction begins
May 30	Thursday	Memorial Day; legal holiday
May 27-31 incl.	Monday-Friday	Final examinations

UNIVERSITY EXTENSION CENTER, MILWAUKEE

General Administrative Staff

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Frank O. Holt, Ph.M., D.Ped., Dean, University Extension Division

Milwaukee Administrative Staff

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George A. Parkinson, Ph.D., Assistant Director; in charge of Evening Classes
Irene Langwill, B.A., Recorder and Adviser to Women (Scholastic Activities)
Ruth G. Reinert, Ph.D., Assistant Adviser to Women (Social Activities)
Hilmar C. Krueger, Ph.D., Adviser to Men

Harry T. Avey, M.E., Superintendent of Building
Myron J. Lowe, Field Representative
Elsa L. Jaeck, B.A., Librarian

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Gladys Wagner, In Charge of General Office Staff

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Phoebe Baur
Helen Carleton
Florence Huber
Catherine Jankowski
Helen Searl, Secretary to Recorder
Sam Slifkin, Chemistry Stock Clerk
Jean Stoneman
Myrtle Volger, Assistant to Miss Wagner

Instructional Staff

Full-time

Amott, Earl, Ph.D., Instructor in Chemistry
Avey, Harry T., M.E., Associate Professor of Mechanical Engineering
Babcock, Mary R., M.A., Assistant Professor of English
Baier, Joseph G., Ph.D., Associate Professor of Zoology
Baker, Lynn E., Ph.D., Instructor in Psychology
Baldwin, Leo S., B.A., B.S., Assistant Professor of Drawing
Bardell, Ross H., Ph.D., Assistant Professor of Mathematics
Bauer, Theodore W., Ph.D., Instructor in History

Bell, Earl R., M.A., Instructor in Physics
Brooks, Dudley C., M.A., Instructor in English
Creamer, John J., B.A., LL.B., Associate Professor of English
Deptula, Szymon St., M.A., Instructor in Polish and English
Doering, Helmuth R., B.A., M.B.A., Assistant Professor of Business Administration
Fuller, William J., B.A., Professor of Civil and Structural Engineering
Goese, Melvin A., M.S., Instructor in Chemistry
Grant, Hiram E., B.S., Instructor in Mechanical Drawing
Hayes, Merlin L., Ph.D., Instructor in Botany and Zoology
Holmes, Mrs. Elisabeth K., M.A., Assistant Professor of English
Holst, Edward D., M.A., Instructor in English
Hursley, Frank M., M.A., Assistant Professor of English
Krueger, Hilmar C., Ph.D., Associate Professor of History
Kunze, Harry L., M.A., J.D., C.P.A., Assistant Professor of Accounting
Lawrence, Lee E., Ph.D., Instructor in History and Political Science
Marden, Morris, Ph.D., Assistant Professor of Mathematics
Martin, Miles J., Ph.D., Professor of Physics
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Myers, Raymond H., M.A., Assistant Professor of Speech
Nordhaus, Edward A., M.S., Instructor in Mathematics
Parkinson, George A., Ph.D., Associate Professor of Mathematics
Person, Philip H., Ph.D., Associate Professor of Sociology
Purin, Charles M., Ph.D., Professor of German and Russian
Reinders, Victor A., Ph.D., Assistant Professor of Chemistry
Reinert, Ruth G., Ph.D., Instructor in History
Reynolds, Mrs. Florence Stehn, M.A., Assistant Professor of French (On leave I)
Roeming, Robert, M.A., Instructor in French and Italian
Roth, William E., Ph.D., Associate Professor of Mathematics
Rouse, T. Alton, Ph.D., Assistant Professor of Physics
Schnaitter, M.R., M.A., Associate Professor of Economics
Sheldon, David C., Ph.D., Instructor in English
Snyder, H. H., B.S., Instructor in Chemistry
Steinfort, Meta M., M.A., Associate Professor of Spanish
Swalheim, Donald, M.S., Instructor in Chemistry
Torinus, Gracia E., M.A., Instructor in English
Town, George G., Ph.D., Professor of Chemistry
Traskell, Charles, B.S., Instructor in Physical Education
Turner, Marion J., M.S., Instructor in Mathematics
Vass, John I., Ph.D., Instructor in Mathematics
Voigt, Mrs. Frieda A., M.A., Instructor in German
Walker, Ruth I., Ph.D., Associate Professor of Botany
Weidman, Robert H., Ph.D., Instructor in German and French
Wesle, Herbert W., B.S., Associate Professor of Topographic Engineering
Wolf, Louise A., Ph.D., Assistant Professor of Mathematics
Young, Charles E., Ph.D., Professor of Romance Languages

THE UNIVERSITY EXTENSION CENTER IN MILWAUKEE

Over 50 per cent of the people of Wisconsin live in the 20 eastern counties centering around the city of Milwaukee, which comprises only 17 per cent of the territory of the state. Over one-fifth of the people of the state live in Milwaukee county. The Regents of the University, therefore, decided that if the Extension Division were to serve effectively this heavily populated section, an extension center would have to be developed in the city of Milwaukee. Rented headquarters were first established in 1908. Through all the years the only program of service developed there has been extension classes. (Other state-wide services of the Extension Division as carried on from central headquarters at Madison are described on page 105).

After the World War the federal and state government requested the Extension Division to establish in Milwaukee a curriculum of freshman and sophomore courses in Letters and Science, Commerce, and Engineering for returned veterans whose tuition was to be paid by the government. This was done, and the courses became so popular that a number of Milwaukee parents requested the University to allow their sons and daughters, then graduating from high school and unable financially to go to Madison, to take these courses along with the veterans, and receive college credit. Permission was granted, and in 1923 the Regents of the University offered these freshman and sophomore extension courses to be made available to the graduate of any accredited high school in Wisconsin.

In 1921 the Legislature appointed an interim committee to make a special study of the Milwaukee extension situation, and of the need for a state-owned building. This committee made a printed report of its findings to the 1923 Legislature and recommended an appropriation of $150,000 for an Extension building in Milwaukee, which recommendation was enacted into law in 1925. The 1927 Legislature, after a full hearing by its joint finance committee, voted an additional $175,000 in order to build a building large enough to care for the actual needs. During the 1925 Legislature the State Attorney-General, when requested for a ruling, reported that the University Extension program in Milwaukee and the proposed building were legal and constitutional. From that day to this no policy has been altered that might in any way invalidate this ruling. While in the day classes there has been a normal growth in the number of students taking freshman and sophomore credit courses, in the evening classes the demand is more for the non-credit courses in liberal education and in those business and engineering subjects on a college level which fit one for progress in the industrial world.

One of the reasons why the classes in Milwaukee have been so popular is the fact that they are meeting the need of adults who must work for a living while trying to get an education. Milwaukee, being the largest city in Wis-

consin, offers a great variety of opportunities for adults to find full or part-time employment while taking these courses.

The adult who has already passed the school and college age, who must work and earn his living and in many cases provide at the same time for a family, cannot carry a full residence program of studies. Colleges make out their schedules and curricula to meet the needs of full-time, relatively young students. The class program at the University Extension Division in Milwaukee, on the other hand, is organized to meet the special requirements of adults who are already in the practical work of life. The Extension Division offers courses in the morning, afternoon, late afternoon, and evening, so that an adult may attend classes at any period when he is not working.

The building was completed during the summer of 1928. It comprises seven stories and contains twenty-five classrooms and lecture halls, six science laboratories (physics, chemistry (2), biology, engineering, and radio), and a spacious library and reading room.

The kind of institution which the University of Wisconsin Extension Division is developing in Milwaukee is one that can organize a program of study to meet the needs of the individual rather than one that forces the individual to follow a regular curriculum. Among those whose needs are given special attention are the following:

The student who must work and earn part or all of his expenses while taking courses.

The individual who wishes to have a special program of studies suggested by faculty advisers to fit his particular needs and abilities.

The adult who wishes to select his own courses without reference to credit toward a degree or the securing of a certificate.

The student who can afford to devote only two years to preparation for a position that requires college training.

The high school graduate who wishes to do his first two years of college work in an institution near home.

The adult who wishes to broaden his education along lines of his own choice for purposes of self-improvement, intelligent citizenship, and general culture.

GENERAL INFORMATION

LOCATION

Classes are held in the University Extension building at 623 W. State Street. The classroom and lecture halls which this building affords, together with its library and science laboratories, enable the Extension Division to offer a comprehensive program of studies.

OPPORTUNITIES FOR WORK

Milwaukee, being the largest city in Wisconsin, offers excellent opportunities for employment for students who must earn a portion or all of their expenses. The Milwaukee Center has a student employment service which assists students in finding work and which maintains close contact with many industrial and business concerns in the city. The program of credit classes is so arranged that students may plan their programs at convenient hours throughout the day or evening. The non-credit courses are scheduled at late afternoon and evening hours.

REDUCED PROGRAMS

Students in day classes are expected to take the full program of the course elected. If, however, a student finds it necessary to take a reduced program because of his work or for some other legitimate reason, he must obtain written permission from the proper authorities when he registers.

GUIDANCE AND COUNSELING

This work is carried on by the Guidance Committee and other members of the faculty who are acting as student counselors. Each student is assigned to a counselor as soon as he matriculates. His counselor helps him plan a program of studies which is best suited to his needs. It is always possible to choose a program which fits the student's individual abilities from the wide variety of courses offered in Business, Engineering, Letters and Science, and Liberal Education. The student is encouraged to confer with his counselor and to discuss with him his academic and personal problems as they arise.

During the month of August, the Extension Division offers a free guidance service to all high school graduates regardless of where they plan to attend school. Vocational interest tests are administered. On the basis of these tests and a conference with a member of the guidance staff, a student is able to plan more intelligently a college program which fits his own particular needs and abilities.

REGISTRATION

Registration consists of filling out the necessary blanks provided at the office and the payment of fees for the courses taken. **The student is not placed on the class roll until he has complied with this rule.**

For dates of registration, see calendar on page 3. The office is open from 8:00 a.m. to 5:00 p.m. and from 7:00 to 9:45 p.m. on all weekdays except Saturday, and from 8:30 a.m. to 12:00 noon on Saturday. During the registration period the office is open continuously from 8:00 a.m. to 9:00 p.m. on all weekdays except Saturday and on Saturday from 8:30 a.m. to 3:00 p.m.

FEES

A fee of five dollars ($5.00) a credit hour is charged for all university credit work in the Extension Division. Laboratory fees and textbooks are additional. The fee for non-credit courses is specified in the bulletins describing these courses.

All fees are payable at the time of registration. One dollar ($1.00) is charged for late registration in the day classes and in the evening classes.

DEFERRED PAYMENTS

In day classes arrangements may be made for the payment of fees in three installments. Under this plan one-third of the amount of tuition, all laboratory fees, and an additional charge of $3 must be paid at the time of registration.

Evening class fees amounting to more than $10 may be paid in two installments. One half of the amount of the tuition, all laboratory fees, and an additional charge of one dollar must be paid at the time of registration.

WITHDRAWALS AND REFUNDS

Day Classes

Partial refunds to students withdrawing from the day classes are made upon the following basis if written notice is given at the time of withdrawal: within two weeks from the first day of instruction, 80% refund; within four weeks, 60%; within six weeks, 40%; within eight weeks, 20%; after eight weeks, no refund. The late registration fee and the additional fee for deferred payments are not refundable.

Evening Classes

All applications for refunds must be made in writing.

In cases where a class is discontinued or the meeting day of the class is changed after a student has registered, the entire amount of the fees paid will be refunded upon the written application of the student.

Applications for cash refunds not covered by the preceding paragraph must be made before noon of the third Saturday following the beginning of the class; a registration fee of 20% will be retained from each class fee. The late registration fee and the additional fee for deferred payments are not refundable.

A student withdrawing who notifies the office in writing during the period from the fourth to the sixth week inclusive after the beginning of the

class will receive a credit memorandum card covering a fraction of the fee paid, according to the following schedule:

Fourth Week 75%
Fifth Week 70%
Sixth Week 65%

This card is not transferable except to a member of the immediate family of the person to whom it is issued; it may be applied on a future enrollment provided it is used within two years from the date of issue.

The business office of the Milwaukee Center may in unusual cases extend the period indicated above for the granting of credit cards in instances where the student withdrew before the end of the sixth week of school but failed, for some unavoidable reason, to make application for a credit refund until after the end of the six-week period. **Students withdrawing from a class at any time during the semester are required to notify the office in writing or they will receive a failure in the course. Students are considered members of a class until this regulation is complied with.**

Books and Supplies

In order to serve the student body effectively, the Extension Division maintains a book store in which necessary texts and supplies may be purchased.

ATTENDANCE

Day Classes

It is expected that every student will be present at all the meetings of the classes in which he is enrolled. Any student who at the date of the mid-semester examination in any course has been absent from more than five per cent of the total number of meetings to be held during that semester and who fails to pass said mid-semester examination may be required to drop the course with failure. Any student whose percentage of absences for any semester in any course exceeds ten per cent of the total number of meetings scheduled for that course may be excluded from the final examination and given a condition.

Absence from a recitation immediately preceding or following the Thanksgiving or Christmas or Spring Recess shall count as two ordinary absences.

Absence from a quiz section carries a grade of zero for the period covered by that quiz section unless the work is made up to the satisfaction of the instructor concerned.

Evening Classes

Students desiring University credit are not allowed more than two absences a semester in any two-credit course. Those having absences in excess of that number shall satisfy the instructor that the work has been made up by special examination or otherwise before credit is given. In certificate courses

four absences are allowed. Absences in excess of this number are to be made up in a manner similar to the procedure as outlined above for credit courses.

All students who receive credit toward a degree or a certificate must take the final examination and make a minimum grade of 70 per cent for the course.

CHANGE OF STUDIES AND DROPPING STUDIES

Day Classes

A student who wishes to make a change in his schedule of studies must secure the written approval of his counselor and of the head of the department concerned.

A student who drops a subject without written permission secured in advance will receive a failure in that study and may be subject to further discipline by the faculty.

DEFICIENCIES

Failures

In general, a student who has failed in any required subject must remove the failure by repeating that subject in class **as soon as it is again offered** and securing a passing grade.

Conditions

The grade of condition is given to a student who has carried a subject throughout a semester with a passing average, but who, failing in his final examination, reduces his semester average to some numerical standing between 60 and 69. In order to remove a condition a student must pass a special examination during his next succeeding semester of residence or it becomes a failure. If, in a course involving both laboratory and classroom work, the condition has been incurred on account of unsatisfactory laboratory or report work, it may be removed by absolving such substantial requirements as the instructor in charge of the course may prescribe. The removal of this type of condition will take effect on the official date for the removal of conditions.

For dates for the removal of conditions, see calendar, page 3. Applications for these examinations must be made to the Recorder ten days before the date given.

STUDENT ACTIVITIES

Extracurricular activities must terminate two weeks before final examinations. Exceptions: athletic events and commencement exercises.

Regulations

1. Students who are enrolled for University credit may be **members** of student organizations, subject to the regulations of such organizations.

2. Students who are enrolled for University credit may participate in extracurricular activities, subject to the following restrictions.
   a. Only students who are enrolled for nine or more University credits may participate in extracurricular activities designated as "**major**" and "**minor,**" except by special permission of the Committee on Student Activities.*
   b. Students who enter the University on **probation** or who are placed on **probation** by the Committee on Scholarship may not participate in major or minor activities until such probation is removed. Students on probation may be pledged but not initiated by any fraternity or sorority.
   c. Students who are eligible may not at any time carry more than **eight** points in major and minor activities. Every major office or function is to be counted as three points and every minor office or function as two points.

   For regulations governing participation in forensic and athletic activities, see pages **14 and 16.**

3. Any student organization not under the direct supervision of a department of instruction in the Milwaukee Center, desiring to hold a special open meeting, must petition in the following order:
   a. The Student Council.
   b. The Faculty Committee on Student Activities.

Arrangements must then be made with the secretary to the Director for a room assignment for the meeting.

Any student organization under the direct supervision of a department of instruction in the Milwaukee Center must arrange with the Faculty Committee on Student Activities to hold an open all-student meeting. All petitions must be in the hands of the Student Council on the Monday before the next regular meeting of the Council and in the hands of the Faculty Committee on Student Activities on the Tuesday before the next regular meeting of that committee.

Preference to events will be given on the basis of priority. Responsibility for adhering to regulations rests with the Student Organization. Special Student Convocations arranged by the Director, and regular student class meetings called by the Student Council on the second Friday after the beginning of a new semester take precedence over other events.

Badger Record

The Badger Record is a bi-weekly newspaper containing news, feature articles, and editorials about school activities. It affords an opportunity for all interested students to do some work in journalistic writing, newspaper make-up, and advertising.

Co-ed Club

The Co-ed Club is the only organized girls' group open to all freshman and sophomore girls.

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* A list of the major and minor activities will be found on the official bulletin board.

Forensics

Students interested in applied public speaking may participate in inter-squad and intercollegiate after-dinner speaking, debate, discussion, extemporaneous speaking, and oratorical contests. Only students with better than average scholastic standing in courses making up a normal credit load are eligible for intercollegiate forensic activities.

Forestry Club

Membership is open to all Pre-Forestry students and to all other students interested in forestry. The purpose of the organization is to give students a knowledge of the field of forestry and to aid in conservation practices. Meetings are held twice each month. They may be either in the nature of special lectures or of field trips.

German Club

The German Club, which meets every three weeks, aims to acquaint its student members with Germany and its people and with the achievements of Germany in the fields of art, science, and literature. In addition it furnishes supplementary practice in language work. Musical numbers, presentation of plays, recitations, short talks on cultural subjects, and singing of popular folk-songs make up the programs. Other meetings held during the year are of a purely social character intended to promote good fellowship. Some of the meetings are open to the public.

Greek Letter Societies

Social

The sororities, Phi Delta Delta and Tri Omega, and the fraternities, Gamma Kappa Phi and Sigma Delta Omega, are local organizations.

Honorary

The Alpha Chapter of Sigma Epsilon Sigma, a branch of the Alpha Chapter of the University of Wisconsin, was installed at the Milwaukee Center in the fall of 1937. All women having completed their freshman year with a scholastic average of 2.5 or more are eligible.

Mathematics Club

The Mathematics Club is an organization of the students who are interested in mathematics. The club holds monthly meetings at which papers are presented by students and members of the faculty. At least one meeting each year is devoted to playing mathematical games and solving mathematical puzzles. The purpose of the club is to stimulate the interest of students in mathematics by discussing many interesting phases of the subject which cannot be taken up in the classroom, and by showing the fundamental relation of mathematics to the other sciences.

For information about the Euler prize, see page 17.

Mathematics Exhibit

During the second semester, the Mathematics Club has an evening meeting to which it invites all members of high school mathematics clubs in the city. All other students interested in mathematics are welcome. The members present a program consisting of several talks on various topics in mathematics. Also, there is an exhibit of mathematical models, instruments, drawings, and computing machines. Many of the drawings and models are made by the students during the school year. For date, see calendar on page 3.

Photo Club

The Photo Club is a group of ambitious amateur photographers organized under the auspices of the Department of Physics. The purpose of the organization is to improve photographic techniques and to promote an interest in pictorial photography. Meetings are held twice each month, the programs consisting of discussions and demonstrations of photographic processes. Membership is not limited to students. Anyone who is interested in photography may join the club. An annual exhibit of the work of the club is held in the spring.

Polish Club

Any student of Polish origin or any one interested in Poland, Polish culture, or Polish language is eligible to join this club, which meets the first Monday of each month. Members of the club participate in Polish crossword puzzle contests, anagrams, attend various Polish cultural functions in the city, and cooperate with other local groups having similar interests. Correspondence is carried on with Polish students in Poland who are studying the English language. Social activities usually close the meeting.

Spanish Club

All students now studying Spanish as well as others who have studied Spanish in the past are eligible to membership. The members plan to hold monthly meetings with carefully prepared programs. Each program consists of two distinct parts: first, a formal program of special numbers such as talks, reports, music, dancing, dialogues or plays; second, a social program with informal group songs, games, and contests.

Spotlight Club

Students desiring experience in acting, producing, costuming, or writing plays are welcome in the Spotlight Club.

Student Council

Four representatives from the freshman class and four representatives from the sophomore class, elected at convocations, serve as the Council.

The Student Council aids directly in the administration of student affairs. It is the official organization for student expression in matters pertaining to the welfare of the school.

The Student Council acts as co-ordinator of extracurricular activities and provides supervision of recreation and study rooms. In fulfilling its purpose of promoting the best interests of the student body, it is a clearing house for student problems.

PHYSICAL ACTIVITY REQUIREMENT

Regulations Concerning Physical Activities for Men

A. Physical activity requirement.[1]

The physical activity requirement may be met in one of two ways:

(1) Three hours a week of physical education work at a recognized gymnasium.

(2) Participation in major sports[2] at the Milwaukee Center to the extent of at least 102 hours.

B. Participation in intercollegiate activities.

The requirements for membership on an intercollegiate team are based upon the following regulations:

(1) Enrollment for university credit.

(2) No disciplinary probation.

(3) No failure, condition, or incomplete at midsemester, or the end of the semester, immediately preceding the date of participation.

(4) Consent of the Coach and the Athletic Committee.

The Athletic Committee has final jurisdiction over all of the above requirements.

Students expecting physical education credit must enroll with the Coach at the beginning of each semester.

Regulations Concerning Physical Activities for Women

The physical activity requirement may be met in one of two ways:

(1) Two semesters of physical education work at an approved gymnasium.

(2) Participation in certain sports under an approved director.

Students expecting physical education credit must enroll with the Coach at the beginning of each semester.

SCHOLARSHIP AWARDS

The Gamma Kappa Phi Fraternity each year awards a cup on which is engraved the name of the student who is selected by the faculty as having achieved a superior record in general scholarship and as having shown school loyalty and fraternal spirit. In addition, a scholarship emblem is presented to the winner. Students competing for this honor must have taken at least three semesters' work at this institution.

A similar cup is awarded, through the courtesy of Mr. George Brumder, for superior work in German. The candidates competing for this award must have studied German at the Extension Division for at least two semesters

[1] Students who transfer to the University at Madison with at least sophomore standing are automatically exempt from the physical activity requirement.

[2] A complete list of the available sports will be posted on the official bulletin board.

and must have obtained not less than 28 credits in that year, with a minimum average of C.

Sophomore Honors and Sophomore High Honors are awarded at the close of the year to those students who have made records similar to those required for obtaining the same honors at the University of Wisconsin.

A special award is granted each year to the sophomore who has the highest number of grade points per credit for two full years' work at the Extension Division.

Freshman Honors are awarded each year to three students having the highest number of grade points per credit for that year. The standing of the various students is computed upon the basis of their first semester grades and the mid-semester grades of the second semester. A student eligible for this award shall have carried a full schedule of work, that is to say, shall have completed a minimum of 28 credits of work by the end of the semester in which the award is made.

THE EULER PRIZE IN MATHEMATICS

A prize is awarded annually at the commencement exercises in June for the best paper presented by a student before the Mathematics Club on a subject chosen by the student and approved by the Department of Mathematics. The prize is known as the Euler Prize. If, in the opinion of the mathematics faculty, no paper is presented before the Mathematics Club which merits the awarding of the prize, no prize is awarded.

THE LIBRARY

The library contains over 9,000 books. It receives, currently, 90 periodicals of both general and technical interest.

Books may be drawn for home use for a two-week period, with the exception of reference books and books reserved by the faculty for supplementary reading. Reserve books are available for a two-hour period.

Library hours

8:30 a.m. -9:30 p.m. Monday—Friday
9:00 a.m.-12:00 a.m. Saturday

The library is closed during the summer.

LECTURE BUREAU

The University Extension Division in Madison strives to make its services readily available to societies, organizations, study groups, and the public. It maintains a special bureau through which arrangements may be made for lectures by members of its faculty. These lectures include discussions and demonstrations in many fields: astronomy, business, chemistry, child guidance, linguistics, literature, mathematics, physics, radio, travel, zoology.

Persons desiring speakers for clubs, assemblies, business or technical gatherings, or study groups should get in touch with the Bureau. The fee for the lecture may be arranged with the Bureau. Information regarding this service may be obtained by writing the Lecture Bureau, University Extension Division, Madison, Wisconsin.

UNIVERSITY CREDIT COURSES

ADMISSION

REQUIREMENTS FOR ADMISSION BY CERTIFICATE

The usual means of gaining admission to the University is by presenting a certificate of graduation from an accredited four-year or an accredited senior-high school showing satisfaction of the underwritten requirements and bearing the principal's recommendation of the candidate's fitness for college.

Graduates of four-year non-accredited schools in Wisconsin who have satisfied the full requirements for admission to the University may be admitted on probation, without examination, upon recommendation of the principal.

1. DEFINITIONS. A *unit* represents a norm of five class-periods per week in one field of study for a school year of at least 36 weeks. Two laboratory periods in a science or other subjects are considered equivalent to one class period. In subjects not usually taught throughout an entire school year, a unit may be constructed by adding a semester each of two related subjects.

Except in foreign language (see below), a *major* consists of three or more units in one field of study and a *minor* consists of two units in one field of study.

"Unrestricted" admission to the University is admission which opens to the student all colleges, courses, and fields of study to which freshmen are eligible and insures full freedom of choice among all the college majors and fields of specialization.

"Restricted" admission opens to the student such colleges, courses, and fields of specialization as do not require high-school mathematics as background. It does not give admission to the College of Engineering. It may give admission to the College of Agriculture and the Course in Chemistry, but the deficiency must be removed at an early date, in accordance with the conditions imposed by the Office of Admissions. It does not permit the student to major or specialize in chemistry, commerce, economics, mathematics, pharmacy, pre-medicine, medical technology, philosophy, political science, psychology, or sociology, or in any of the other natural sciences including physical geography and geology, or to graduate from the School of Education with a major or minor in any of these fields until the deficiency has been removed. (See paragraph 6 below.)

2. Sixteen units are required of a graduate of a regular four-year high school for admission as a regular student of any college or courses open to freshmen.

3. Admission of such graduate shall be based upon: (a) the completion of two majors and two minors selected from four of the fields in Group A (below); one of these majors shall be English and Speech (unless the candidate

offers a minor in foreign language, in which case a minor in English and Speech will suffice); and for "unrestricted" admission one major or minor shall be in mathematics, *i.e.*, one unit of algebra and one unit of plane geometry, with an additional half-unit of algebra recommended in the case of those who seek unqualified admission to the College of Engineering; and (b) the completion of the additional units necessary to make a total of sixteen units selected from Group A and Group B (below), with the provision that not more than six of the sixteen units may be presented from Group B. Pupils planning early in their high-school career to enter the College of Letters and Science or the College of Engineering are advised to present all sixteen units from Group A. Until further action by Faculty and Regents not more than two units in advanced applied music or, alternatively in art will be accepted under Group A. (Broadly speaking advanced applied music may be provisionally defined as applied music based upon two years of preparation in band or orchestra, or equivalent preparation in chorus. The units in art shall be based upon adequate preparation in free-hand drawing in the grades or an equivalent.)

4. Graduates of high schools which maintain a senior-high-school division shall present twelve units from this division to include: (a) one major and two minors selected from three of the fields in Group A or four minors selected from four of the fields in Group A; one major or minor shall be in English and Speech, and for "unrestricted" admission one major or minor shall be mathematics (as described above) unless, before entering the senior-high school, the entrant has completed one of the two units in mathematics specified in the preceding sub-section, in which case the completion of the second unit will suffice. (b) The remaining units shall be selected from Group A and Group B. (See advice in preceding sub-section.)

FIELDS OF STUDY

Group A

English and Speech	Mathematics
Foreign Language	Natural Sciences
History and the Social Sciences	Advanced Applied Music or Art

Group B

Agriculture	Industrial Arts
Commercial Subjects	Mechanical Drawing
Home Economics	Optional (2 units)

5. The foreign languages accepted for admission are French, German, Greek, Hebrew, Irish, Italian, Latin, Norse, Polish, and Spanish. If foreign language is offered under Group A, it must consist of at least a minor in one language. Three or more units in one foreign language or two units in each of two foreign languages shall constitute a major. A single unit of foreign language (i.e., one unaccompanied by a foreign-language minor) may be offered as an optional subject under Group B. (Four units in one foreign language are preferable to two units in each of two foreign languages.)

6. "Restricted" standing may at any time at the option of the student be changed to "unrestricted" standing by the mastery, subsequent to high-school graduation, of the content of high-school algebra and plane geometry by private study, tutoring, or correspondence study. The University will not provide residence instruction in this preparatory work.

II. Graduates of Wisconsin high schools need not meet the above requirements if, on the combined basis of rank in graduating class and aptitude and achievement tests satisfactory to the University, they stand in the upper twenty-five per cent of the average freshman class entering the University and are recommended for college by the high-school principal; but their admission will necessarily be "restricted" unless their preparation includes the two units in mathematics. This does not apply to candidates for admission who have graduated from schools outside the state of Wisconsin.

OTHER METHODS OF ADMISSION

For information about admission on the adult special basis and admission upon examination apply to the Recorder, University Extension Division, Milwaukee.

ADMISSION WITH ADVANCED STANDING

Students from accredited colleges, normal schools, and universities, who have pursued college courses equivalent to those of the University of Wisconsin with an average standing of at least C on an A-B-C-D-Fail grading basis, and who have been granted honorable dismissal from their former institutions, may be admitted to the University. Former students of such institutions can not be received as freshmen on the basis of their preparatory school records.

UNDERGRADUATE CREDIT

The total number of credits that may be earned in the Extension Division combining instruction in day classes, evening classes, and correspondence can not total more than the equivalent of two years' credit in any curriculum.

Graduates of junior colleges or those who have finished two years of work at a four-year college are permitted to elect suitable courses of junior rank if they are offered at the Milwaukee Center. Such students may elect freshman or sophomore work if the requirements for the degree they seek include such work. The nature of this work will be determined by a committee of the faculty of the Milwaukee Center, and the amount is not to exceed two year-courses.

RESIDENCE REQUIREMENTS

The minimum residence requirement is 30 credits and 30 grade-points, to be earned in at least two semesters at Madison (or six summer sessions, in no one of which may less than four credits be carried). All the requirements of the major subject must be met, including at least 15 credits and 15 grade points in advanced work at the University.

All candidates for degrees must expect to take their senior year in residence. They are not permitted to take the advanced work of the major study or the thesis in another institution or by correspondence, since these studies normally culminate in the last year of the undergraduate course. In special cases the Executive Committee of the college, on application to the Dean, may permit a senior who has finished all the specific requirements and the work of his major and thesis, to take not to exceed 6 credits by correspondence to complete the requirements for his degree.

CREDITS AND GRADE POINTS

In order to receive a degree the student must have not only the number of credits required in the course which he is pursuing, but his studies must reach a certain average of excellence. This standard is fixed by the grade-point system, which requires for graduation from any course as many points as credits. The following table shows the University scale of grading, together with the number of points per credit for each grade:

Grade	Percentage Equivalent	Points per Credit
A (Excellent)	93-100	3
B (Good)	85- 92	2
C (Fair)	77- 84	1
D (Poor)	70- 76	0
Condition	60- 69	0 (—½)
Failure	Below 60	0 (— 1)

A student in the general courses in Letters and Science who has received a grade of **B** in **each** subject of the preceding semester may take not to exceed 18 credits.

UNIVERSITY COURSES OF THE FRESHMAN AND SOPHOMORE YEARS

The University Extension Division offers freshman and sophomore programs of study in the following courses:

Chemistry	Pre-journalism
Engineering	Pre-law
Letters and Science (General)	Pre-medicine
Pre-commerce	Pre-nursing
Pre-education	Social Work

All of these courses are approved by the respective residence departments at Madison and carry full credit toward a university degree.

Students who plan to take

Agriculture	Medical Technology
Art Education	Music
Home Economics	Pharmacy
Library Course	Physical Education

should consult the recorder about adjustment of programs.

LETTERS AND SCIENCE CURRICULA

Recommended Sequences for Freshman and Sophomore Years

(For complete information about requirements, see bulletin of College of Letters and Science)

1. B.A. General Course. Credits required for degree 120

Freshman

	Credits per semester
English 1a-1b	3
Foreign language	3-4
History, Mathematics[1], Science — Two of these are required, at least one to be taken in the freshman year.	3, 3-4, 5
Physical activity requirement	
	14-16

Two foreign languages may be elected if desired. Mechanical Drawing (3 credits) may be elected if the student wishes to take only one study from the mathematics-science-history group in the freshman year.

Sophomore

	Credits per semester
English 30a-30b	3
or 33a-33b	2
Foreign language (if requirement has not been met)	3-4
Freshman requirements (if not met the first year)	?
Electives	?
	14-16

2. Ph.B. General Course. Credits required for degree 120

(a) English: 6 credits in freshman composition are required of all; in addition, 4 credits in intermediate composition are required of all excepting those who fulfill option 3 under (c) below, or who complete successfully one year of foreign language in college.

(b) Science and Mathematics:[2] A total of 20 credits in one of the following combinations:

1. Science, 20 credits
2. Mathematics, 20 credits
3. Science, 10 credits; Mathematics, 10 credits
4. Science, 12 credits; Mathematics, 8 credits

[1] Mathematics 7 does not count toward the optional requirement for the B.A. degree except for students graduating from the School of Commerce.

[2] Mathematics 7 does not count toward the optional requirement for the Ph.B. degree except for students graduating from the School of Commerce.

All students taking science under this requirement must elect, for the first 10 credits, one of the continuous year courses. For those taking 20 credits in science, the 10 additional credits may be taken either in another continuous year laboratory course, or in courses in the same science which include laboratory or field work; the 2 additional credits, for those taking 12 credits in science, must be in courses in the same science which include laboratory or field work, except that where Geography 1-2 is elected, 5 credits of Geology 130 must be taken to satisfy this requirement.

(c) Two of the following groups:

1. Philosophy and psychology; or mathematics—10 credits in one of the two. Mathematics may not be offered both here and under (b) above.
2. History, 10 credits, to be taken in year courses.
3. Foreign language, 14 credits (to be earned in college) not more than 8 of which may be in a first-year college course; or intermediate knowledge in one foreign language, as disclosed by an attainment examination.

3. **Chemistry Course (leading to B.S. degree) Credits required for degree ..130**

Admission to the junior year in the Chemistry Course is restricted to those students who have a grade-point average of 1.5 or better for courses in chemistry, mathematics, and physics combined.

Freshman

	Credits per semester
Chemistry 1a-1b and 3	5-6
English 1a-1b	3
German or French	3-4
Mathematics	3-4
Physical activity requirement	
	16-17

Sophomore

	Credits per semester
Chemistry 11a-11b	5
German or French	3-4
Mathematics 5a-5b	3
Physics 1a-1b	5
	16-17

4. (a) **Pre-commerce Course (leading to B.A. degree) Credits required for degree** 128

Admission to the School of Commerce is restricted to those students who have a grade-point average of 1.3 or better for their work in the College of

Letters and Science, this work to include Economics 1a, Commerce 8, and Commerce 9.

Students not presenting Economics 1a and Commerce 8 and 9 **may** be admitted by the Director of the School on probation; their admission must not be taken for granted.

Freshman

	Credits per semester
English 1a-1b	3
Foreign language	3-4
Mathematics[1]	4
History 3 or 5 credits	3-5
or	
Science 5 credits	
Physical activity requirement	
	14-16

Sophomore

	Credits per semester
Accounting (Commerce 8-9)	3-4
Economics 1a	4
English 30a-30b	3
or 33a-33b	2
Foreign language	3-4
Elective	?
	15-16

(b) Pre-commerce Course (non-language, leading to Ph.B. degree). Credits required for degree 128

Freshman

	Credits per semester
English 1a-1b	3
History	3
Mathematics[1]	4
Science	5
Physical activity requirement	
	14-16

[1] Including Theory of Investment (Math. 7).

Sophomore

	Credits per semester
Accounting (Commerce 8-9)	3-4
Economics 1a	4
English 2a-2b[1]	2
History	2-3
Elective	?
	14-16

5. **Pre-education Course (leading to B.S. degree in education). Credits required for degree** 124

Students who expect to transfer to the School of Education should select one of the following sequences:

Sequence I

A. No foreign language required

B. Required:
English composition, 10 credits (English 1 and 2)
History, 10 credits†
Social sciences, 6 credits‡
Mathematics¶ or philosophy, 10 credits**
Natural science, 20 credits§ in regular year courses

Sequence II

A. Required:
Intermediate knowledge of one language

B. Required:
English composition, 6 credits; English literature, 4-6 credits
History, 6 credits†
Social sciences, 6 credits‡
Mathematics, 8 credits,¶ or philosophy, 6 credits**
Natural science, 10 credits in the elementary survey courses or in regular year courses or in both§

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[1] Not required if foreign language option for Ph.B. degree has been absolved.

† Must include a year course in European (Course 2 or 5) or American history.

‡ Political Science 7 (3 credits), Geography 6 (3 credits), and economics or sociology (3 credits) are recommended.

¶ Mathematics 7 may not be counted in satisfaction of this requirement.

** Philosophy 21 (3 credits) and Philosophy 11 (3 credits) are required.

§ Must include at least one semester course in the biological sciences, zoology being strongly recommended. It is recommended that the rest of the science requirement be met in the physical (non-biological) sciences.

Sequence III

A. Required:
Intermediate knowledge of one language

B. No English literature required
Required:
English composition, 6 credits
History, 6 or 10 credits†
Social sciences, 6 credits‡
Mathematics, 10¶ or 8 credits¶ **or**
Philosophy, 10 or 6 credits**
Natural science, 20 credits in regular year courses§

(If history is elected for 6 credits, mathematics or philosophy must be elected for 10 credits; if history is elected for 10 credits, mathematics or philosophy should be elected for 8 or 6 credits, respectively.)

Sequence IV

A. Required:
Proficiency in one foreign language, **or**
Intermediate knowledge in two foreign languages, **or**
Intermediate knowledge in one foreign language plus 10 credits in literature courses in that language

B. Required :
English composition, 6 credits; English literature, 4-6 credits
Two of the following:
(a) history, 6 credits†; and social sciences, 6 credits‡
(b) mathematics, 8 credits¶
(c) natural sciences, 10 credits in elementary survey courses or in regular year courses or in both§

6. Pre-Journalism Course (leading to B.A. degree). Credits required for degree 124

Freshman

	Credits per semester
Journalism 1a-1b	1
English 1a-1b	3
Foreign language (one or two)	3-8
History 1a-1b, 2a-2b, 5a-5b, or 10a-10b	3
Science or Mathematics[1]	5-4
Physical activity requirement	
	15-16

† Must include a year in European (Course 2 or 5) or American history.

‡ Political Science 7 (3 credits), Geography 6 (3 credits), and economics or sociology (3 credits) are recommended.

¶ Mathematics 7 may not be counted in satisfaction of this requirement.

** If philosophy is chosen, Philosophy 21 (3 credits) and Philosophy 11 (3 credits) are required.

§ Must include at least one semester course in the biological sciences, zoology being strongly recommended. It is recommended that the rest of the science requirement be met in the physical (non-biological) sciences.

[1] Science recommended.

Sophomore	Credits per semester
English 30a-30b	3
Economics 1a-1b	4
Foreign language	3-4
Political Science 7; Psychology 1	3
Elective (History 4 recommended)	
	15-16

7. Pre-legal Course

Same as either curriculum 1 or 2 above.

Note: Three years of undergraduate work in Engineering is accepted for admission to the Law School, provided it includes 6 credits in Social Sciences.

Note: Grade-point average of 1.3 required in three years of pre-legal studies.

8. (a) Premedical Course (leading to B.A. degree).

Freshman

First Semester	Credits	Second Semester	Credits
Chemistry 1a[1]	5	Chemistry 1b	5
English 1a	3	English 1b	3
French or German	3-4	French or German	3-4
History or Mathematics	3-4	History or Mathematics	3-4
Physical activity requirement		Physical activity requirement	
	15-16		15-16

Sophomore

Chemistry 20a, 21a	4	Chemistry 20b, 21b	4
English 30a or 33a	3-2	English 30b or 33b	3-2
French or German	3-4	French or German	3-4
Zoology 1—Animal Biology	5	Zoology 104—Comparative Anatomy	5
	15-16		15-16

(b) Premedical Course (leading to B.S. degree).

Freshman

First Semester	Credits	Second Semester	Credits
Chemistry 1a[1]	5	Chemistry 1b	5
English 1a	3	English 1b	3
French or German	3-4	French or German	3-4
Mathematics	4-3	Mathematics	4-3
Physical activity requirement		Physical activity requirement	
	15-16		15-16

[1] Premedical students entering the second semester substitute Zoology 1 (Animal Biology) for Chemistry 1a in their curriculum.

Sophomore

Chemistry 20a, 21a	4	Chemistry 20b, 21b	4
French or German	3-4	French or German	3-4
Zoology 1—Animal Biology	5	Zoology 104—Comparative Anatomy	5
Electives	3	Electives	3
	15-16		15-16

PRE-FORESTRY PROGRAM

The subjects listed below correspond closely to the requirements of the forestry courses offered by institutions in other states. Since many schools require attendance at a camp during the summer following the sophomore year, students are advised to consult at an early date the institution to which they plan to transfer.

Freshman

First Semester	Credits	Second Semester	Credits
Botany 1	5	Botany 130	3-4
English 1a	3	Drawing 1	3
Mathematics	4	English 1b	3
Topographic Engr. 1	2	Mathematics	4
	14	Topographic Engr. 2	2
			15-16

Sophomore

Chemistry 2a	4	Chemistry 2b	4
Economics 1a	4	Economics 1b†	4
Topographic Engr. 3	3	Zoology 1	5
Elective	4-5	Elective	3
	15-16		16

Desirable electives include:
Physics 1a, 1b
Geography
English 30 or 33
Speech 1, 2, 8

† A course in history or social science may be substituted for Economics 1b.

ENGINEERING CURRICULA

Leading to the Degree of Bachelor of Science

Credits required for degree .....146.

Freshman Lectures

A course of lectures is provided for freshman engineers. A few of these lectures are on subjects of general interest. For the most part, however, the lectures give the student an idea of some of the problems of the engineer in practice. This series of lectures should help him to realize that the various courses of study are each a necessary part of his training.

Some of the lectures are given by members of the University staff; others by prominent engineers and by representatives of industry.

All freshman engineers are **required** to attend these lectures.

Civil Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Top. Engr. 1—Elementary surveying	2	Top. Engr. 2—Elementary surveying	2
Freshman lectures	0	Freshman lectures	0
Physical activity requirement	0	Physical activity requirement	0
	17		17

Sophomore

	Credits		Credits
Math. 54—Differential and integral calculus	4	Math. 55—Integral calculus	4
Physics 51—Lectures and lab. practice	5	Physics 52—Lectures and lab. practice	5
Top. Engr. 3—Land surveying	3	Mechanics 1, 2—Statics, dynamics	5
Ry. Engr. 1—Railway curves	2	Top. Engr. 104—Advanced surveying and mapping	3
Ry. Engr. 2—Route surveying	3		17
	17		

Mechanical Engineering

Freshman

First Semester	Credits	Second Semester	Credits
Chem. 2a—General chemistry	4	Chem. 2b—General chemistry	4
Draw. 1—Elements of drawing	3	Draw. 2—Elements of drawing	3
Engl. 1a—Freshman English	3	Engl. 1b—Freshman English	3
Math. 51—Elementary analysis	5	Math. 52—Elementary analysis	5
Non-professional elective	2	Non-professional elective	2
Freshman lectures	0	Freshman lectures	0
Physical activity requirement	0	Physical activity requirement	0
	17		17

Sophomore

	Credits		Credits
Math. 54—Differential and integral calculus	4	Math. 55—Integral calculus	4
Physics 51—Lectures and lab. practice	5	Physics 52—Lectures and lab. practice	5
Mach. Des. 1—Mechanism	4	Mach. Des. 2—Design practice	1
Draw. 3—Descriptive geometry	3	Mechanics 1, 2—Statics, dynamics	5
Non-professional elective	2	Non-professional elective	2
	18		17

Electrical Engineering

Freshman

First Semester

	Credits
Chem. 2a—General chemistry	4
Draw. 1—Elements of drawing	3
Engl. 1a—Freshman English	3
Math. 51—Elementary analysis	5
Speech 8—Extempore speaking	2
Freshman lectures	0
Physical activity requirement	0
	17

Second Semester

	Credits
Chem. 2b—General chemistry	4
Draw. 2—Elements of drawing	3
Engl. 1b—Freshman English	3
Math. 52—Elementary analysis	5
Non-professional elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Sophomore

	Credits
Math. 54—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5
Draw. 3—Descriptive geometry	3
Econ. 1a—Elements of economics	4
Elective	2-4
	18-20

	Credits
Math. 55—Integral calculus	4
Physics 52—Lectures and lab. practice	5
Mechanics 1, 2—Statics, dynamics	5
Top. Engr. 108 (elective)	3
	17

Chemical Engineering

Freshman

First Semester

	Credits
Chem. 2a—General chemistry	4
Draw. 1—Elements of drawing	3
Engl. 1a—Freshman English	3
Math. 51—Elementary analysis	5
Elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Second Semester

	Credits
Chem. 2b—General chemistry	4
Draw. 2—Elements of drawing	3
Engl. 1b—Freshman English	3
Math. 52—Elementary analysis	5
Elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Sophomore

	Credits
Chem. 20a—Organic chemistry	2
Chem. 21a—Organic chemistry lab.	2
Chem. 14—Quantitative analysis	5
Math. 54—Differential and integral calculus	4
Physics 51—Lectures and lab. practice	5
	18

	Credits
Chem. 20b—Organic chemistry	2
Chem. 21b—Organic chemistry lab.	2
Math. 55—Integral calculus	4
Physics 52—Lectures and lab. practice	5
Mechanics 1, 2—Statics, dynamics	5
	18

Mining Engineering, Metallurgical Engineering

Freshman

First Semester

	Credits
Chem. 2a—General chemistry	4
Draw. 1—Elements of drawing	3
Engl. 1a—Freshman English	3
Math. 51—Elementary analysis	5
Elective	2
Freshman lectures	0
Physical activity requirement	0
	17

Second Semester

	Credits
Chem. 2b—General chemistry	4
Draw. 2—Elements of drawing	3
Engl. 1b—Freshman English	3
Math. 52—Elementary analysis	5
Top. Engr. 108—Short course in surveying	3
Freshman lectures	0
Physical activity requirement	0
	18

Students who wish to complete the chemical engineering, mining engineering, or metallurgical engineering courses in four years are advised to transfer to the College of Engineering at Madison at the beginning of the sophomore year.

EVENING CERTIFICATE COURSES

BUSINESS

The completion of a well-rounded program of study is of much greater benefit to the student of Business than the taking of separate courses at random. Realizing this, the University of Wisconsin, through the Extension Division, will give a special certificate to young men and women who satisfactorily complete a series of related courses in any one of six special fields. The certificate may be earned in Accounting, in Marketing and Advertising, in Finance and Credit, in Industrial Management, in General Business, or in Secretarial Work. For certificate courses in Real Estate, see page 33.

In order to secure a certificate, a student must have completed satisfactorily twenty-four semester hours (ordinarily twelve courses) in one of the six special fields in which certificates are granted, including all the required courses and certain elective courses. **No course is completed unless a final examination is taken. An average grade of C is required for a certificate.** The special requirements for each group are listed below.

To complete the requirements for a certificate in three years, it will be necessary, ordinarily, for the student to attend classes on an average of two evenings a week, but he may, if he wishes, extend the time over a longer period of years. A student who is interested in taking a program of courses in preparation for the certificate should consult a member of the business department, who will be his faculty adviser.

Students who have had courses beyond the high school level should submit their records at an early date for evaluation of credits which can be applied toward a certificate. At least one-half the credits required for any certificate granted by the Milwaukee Center of the University Extension Division must be earned at the Milwaukee Center.

The following lists of subjects show which courses are required and which courses may be elected in each of the six certificate groups. In addition to the required courses the student must elect, with the approval of his faculty adviser, enough courses to bring his total up to twenty-four semester hours. With the approval of a faculty adviser, courses not listed in the groups below may be taken as electives.

Each required course is indicated by a dagger (†).

Certificate Course in General Business

†Business Management
Business English or English 1a
English 1b
†Business Correspondence 702a
Business Correspondence 702b
†Accounting 1
†Accounting 2
Accounting 3
Accounting 4
Business Economics 355a and 355b
Business Law
  †101 Contracts and Agency
  102 Business Transactions
  103 Business Organization
  104 Wills, Trusts, Estates, and Real Property
Business Statistics
Business Psychology
Factory Management
Labor Problems
Personnel Management
†Marketing Practice
Advertising Principles
Advertising Campaigns
Salesmanship
Public Speaking
Banking and Credit
†Management Finance
Investments
Fundamentals of Real Estate Practice
Real Estate Financing

Certificate Course in Accounting

Business Management
†Accounting 1
†Accounting 2
†Accounting 3
†Accounting 4
†Auditing 5a
†Auditing 5b
†Cost Accounting 9a
Cost Accounting 9b
C.P.A. Review
Accounting 12
Retail Accounting
Analysis of Financial Statements
Advanced Accounting Problems 11
Governmental Accounting
Income Tax 402a and 402b
Business English or English 1a
English 1b
Business Correspondence 702a and 702b
Business Economics 355a and 355b
Business Law
  †101 Contracts and Agency
  †102 Business Transactions or
  †103 Business Organization
  104 Wills, Trusts, Estates, and Real Property
Banking and Credit
Management Finance
Investments
Factory Management
Business Statistics

One who intends to enter public accounting work will need to take more than the twenty-four semester hours which are required for this certificate. His faculty adviser will gladly make suggestions for further study.

Certificate Course in Marketing and Advertising

†Business Management
Business English or English 1a
English 1b
†Business Correspondence 702a
Business Correspondence 702b
†Marketing Practice
Industrial Marketing
Business Psychology
Business Economics 355a and 355b
†Advertising Principles
†Advertising Campaigns
Retail Advertising
Accounting 1
Accounting 2
Analysis of Financial Statements
Business Statistics
Banking and Credit
Management Finance
Investments
Credits and Collections
Business Law
  †101 Contracts and Agency
  102 Business Transactions
  103 Business Organization
†Salesmanship
Sales Management
Retail Store Management
Public Speaking
Real Estate Selling

Certificate Course in Finance and Credit

†Business Management
†Accounting 1
†Accounting 2
Accounting 3
Accounting 4
†Analysis of Financial Statements
Business Economics 355a and 355b
Business English or English 1a
English 1b
Business Correspondence 702a and 702b
†Credits and Collections
†Management Finance
†Banking and Credit
†Investments
Stock Market Analysis
Business Law
  101 Contracts and Agency
  †102 Business Transactions
  103 Business Organization
  104 Wills, Trusts, Estates, and Real Property
Real Estate Financing
Life Insurance Fundamentals
Property Insurance

Certificate Course in Industrial Management

†Business Management
†Accounting 1
†Accounting 2
Accounting 3
Accounting 4
†Cost Accounting 9a
†Cost Accounting 9b
Analysis of Financial Statements
Business English or English 1a
English 1b
Business Correspondence 702a and 702b
Business Economics 355a and 355b
Social Security Legislation
Business Psychology
Industrial Marketing
Labor Problems
†Personnel Management
Business Law
  101 Contracts and Agency
  102 Business Transactions
  103 Business Organization
†Factory Management
†Time and Motion Study 250a
Time and Motion Study 250b
Public Speaking
Management Finance

Certificate Course in Secretarial Work

†Business Management
†Business English or English 1a
English 1b
†Business Correspondence 702a and 702b
†Business Psychology
†Accounting 1
Accounting 2
†Secretarial Training 714
Secretarial Training 715
Business Economics 355a and 355b
Business Law
101 Contracts and Agency
102 Business Transactions
Public Speaking
Marketing Practice
Advertising Principles
Salesmanship
Banking and Credit
Management Finance
††Electives

†† Those students who know definitely in what fields they are preparing to do secretarial work should go beyond the subjects listed on these pages and choose electives from business courses in the field selected such as Advertising, Accounting, Finance, or Real Estate. This program is also intended to meet the cultural needs of the students who enroll in it. Students may, therefore, choose electives in such fields as English Literature, Modern Language, History, Psychology, and the Social Sciences.

Before a certificate in Secretarial Work is granted to a candidate, he must satisfy the instructor in charge that he is adequately prepared in shorthand and typing.

Certificate in Business Administration

In addition to the twelve-course certificates, the Extension Division also offers a twenty-course certificate. This certificate is offered because many students feel the need for more training than is provided in the twelve-course certificates.

The required courses are:

Accounting 1
Accounting 2
Accounting 3
Accounting 4
Beginning Public Speaking 7
Business Correspondence 702a
Business Economics 355a
Business Economics 355b
Business Management 350
Factory Management 601
The Law of Contracts and Agency 101
The Law of Business Transactions 102
Management Finance 137
Marketing Practice 501
Personnel Management 351
Practical Business Statistics 139

Note: The additional courses for this certificate may be elected from any of the other business courses offered by the Extension Division.

Students who have received one of the twelve-course certificates may obtain this certificate by taking eight additional courses, provided, however, that in their entire program they have included all of the above required courses.

Certificate Courses in Real Estate

The Milwaukee Real Estate Board will issue an official certificate to anyone who is certified by the University Extension Division as having satisfactorily completed four of the Real Estate courses listed below. After June 30, 1941, the Milwaukee Real Estate Board will require the completion of six courses to obtain this certificate.

To students who satisfactorily complete eight of the Real Estate courses listed below will be issued a University Extension Division certificate endorsed

by the National Association of Real Estate Boards. After June 30, 1941, the requirement for this certificate will be twelve courses, four of which may be electives from the general field of Business.

Real Estate Courses

Fundamentals of Real Estate Practice
Real Property Law and Conveyancing
Real Estate Financing
Real Estate Economics
Real Estate Selling
Real Estate Appraisals
Property Management
City Planning and Zoning
Property Insurance

Certificate Courses in Insurance

The University Extension Division is cooperating with the American College of Life Underwriters and the Life Office Management Association Institute in giving courses leading to the designations, certificates, and degrees offered by them.

C. L. U.

The designation Chartered Life Underwriter (C. L. U.) will be awarded to life insurance underwriters who meet the eligibility requirements of age, character, education, and experience, and who satisfactorily pass a series of examinations in the following subjects:

I. Life Insurance Fundamentals
   a. Economics of Life Insurance
   b. Principles and Practices

II. Life Insurance Salesmanship
   a. Principles of Salesmanship
   b. Psychology of Life Insurance Salesmanship

III. General Education (including English)
   a. Economic Problems
   b. Government
   c. Sociology

IV. Laws, Trusts, and Taxes
   a. General Commercial Law
   b. Wills, Trusts, and Estates
   c. Taxation of Insurance

V. Finance
   a. Corporation Finance
   b. Banking and Credit
   c. Investments

L. O. M. A.

Home office employees of life insurance companies will receive a certificate from the Life Office Management Association upon satisfactorily completing the four examinations in Course Number I: Principles of Life Insurance. Those satisfactorily completing Course Number I and the six examinations in Course Number II, Advanced Life Insurance, will become Associates of the Life Office Management Association Institute.

INSURANCE INSTITUTE OF AMERICA

The Extension Division is co-operating with the Milwaukee Board of Fire Underwriters and the Insurance Institute of America in presenting a series of courses that will constitute a well-rounded program of insurance training in the property and casualty fields.

For information as to specific courses, see semester bulletins.

NATIONAL INSTITUTE OF CREDIT

The National Association of Credit Men has established the National Institute of Credit for the purposes of training men and women for credit work. The Milwaukee Association of Credit Men is co-operating with the University Extension Division in offering a series of related courses that will enable men and women to earn the Junior or the Senior Certificate of the National Institute of Credit.

The Institute Curriculum

For the Junior Certificate the following courses (which need not be taken in the order listed) are required, subject to the exceptions mentioned below.

	Hours[1]
Business Economics (see page 48)	30
Credits and Collections (see page 46)	30
Analysis of Financial Statements (see page 44)	30
Business English (see page 47)	30
Total	120

For the Senior Certificate the following courses are required, subject to the exceptions mentioned below.

	Hours[1]
Business Law (see page 47)	30
Merchandising (see page 51)	30
Public Speaking (see page 56)	30
Advanced Credits	30
Total	120

The following changes in the regular curriculum may be made, subject to the approval of the Director of Education.

For the Junior Certificate:

Advanced Credits may be substituted for Financial Statement Analysis.

For the Senior Certificate:

Business Law is required.

Advanced Credits is required unless it has been taken as one of the requirements for the Junior Certificate.

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[1] By "thirty hours" is meant a two-hour course lasting 15 sessions. The two-hour Extension Division classes, which meet once a week for 17 weeks, fully comply with these requirements.

In the Senior curriculum, other business courses may be substituted for Merchandising or Public Speaking; a substitution may also be made for Advanced Credits if that course has been taken as a part of the requirements for a Junior Certificate. Courses suggested as substitutions are: Management Finance, Investments, Salesmanship, and Banking and Credit.

In no case will credit toward a certificate be given for these or other elective courses unless the work is taken in Credit Institute classes.

EACH SUBSTITUTION MUST BE APPROVED BY THE DIRECTOR OF EDUCATION OF THE INSTITUTE OF CREDIT.

Associates and Fellows

The Institute gives recognition to practical experience, as well as to educational training. Students who have been awarded the Junior Certificate and who have had three or more years of actual credit experience are designated Associates of the National Institute of Credit. Students who have been awarded the Senior Certificate and who have had five or more years of practical experience become (provided they are at least 25 years of age) Fellows of the National Institute of Credit.

Registration

All who expect to qualify for the Junior or Senior Certificates must first register at the office of the Milwaukee Association of Credit Men at 715 North Van Buren Street, and then complete their enrollment at the University Extension Division.

TECHNICAL SUBJECTS

COURSES FOR BUILDERS

Structural Design, the first group of subjects outlined below and offered in evening classes, is intended for men who are working in offices or drafting rooms on structural work, or for men who are interested in structural work. Building Design, the second group outlined, is intended for men who are working or plan to work in architects' offices, and for those who are interested in architectural work. Both courses will be of much benefit either to men who plan to enter contracting work in the employ of some contractor or to men who intend to go into business for themselves. A University Extension Certificate is given for the successful completion of either group of courses.

An average grade of C is required for a certificate.

The demand for competent workers in the fields of design and building is constantly growing, and the responsibilities of men in charge are great. Financial estimates must be accurate; architectural designs must be pleasing in appearance and in ornamental details. Evening study under competent teachers offers the only practical way for the average man to keep pace with modern progress in this field. He will still need the architect and the structural engineer for the large and more important projects, but the training in these courses will fit him to hold more responsible positions, to bid more intelligently and accurately, and to plan architectural details and supervise small projects more competently.

STRUCTURAL DESIGN

First Year

First Semester	Second Semester
#Mechanics 206a	#Strength of Materials 207

Second Year

Structural Theory 450a	Structural Theory 450b

Third Year

Structural Theory 450c	Structural Theory 450d
Estimating for Builders 497a	Estimating for Builders 497b

Fourth Year

#Reinforced Concrete 417a	#Reinforced Concrete 417b

BUILDING DESIGN

First Year

First Semester	Second Semester
#Mechanics 206a	#Strength of Materials 207

Meets twice a week.

Second Year

Architectural Drawing 243a	Architectural Drawing 243b
Structural Theory 450a	Structural Theory 450b

Third Year

Estimating for Builders 497a	Estimating for Builders 497b
Architectural Design 1a	Architectural Design 1b

HEATING, VENTILATION, AND REFRIGERATION

This two-year course is offered for builders, draftsmen, engineers, contractors, estimators, building inspectors, and others who will be benefited by a practical course which will help them to plan, install, estimate, and inspect the various types of mechanical equipment which enter into the construction of our modern buildings. The aim throughout the course is to make the work extremely practical.

The course provides a good foundation training for those with little or no previous experience or instruction in the subjects outlined; it should also prove valuable to those who wish a review of the fundamental principles involved in the various subjects.

A certificate is given by the University Extension Division upon the satisfactory completion of the course.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics, especially arithmetic, is required for entrance.

First Year

First Semester	Second Semester
Architectural Drawing 243a	Architectural Drawing 243b
Estimating for Builders 497a	Estimating for Builders 497b

Second Year

Heating and Ventilating 223a	Heating and Ventilating 223b
Fuels and Combustion 231	Refrigeration 222

MACHINE DESIGN

Students in evening classes may qualify for a certificate in Machine Design by successfully completing the course as outlined below.

The student who intends to become a machine designer should have as basic training some experience in shop practice. This practice he must secure in some shop where he will learn the uses and limitations of machine tools. At the same time he can qualify in elementary drafting by taking the evening class work in mechanical drawing. This will enable him to secure the necessary skill to advance to the position of draftsman. He must then take up the study of mechanical movements and of mechanical principles, as well as the properties and strength of cast iron, steel, brass, and other material. In this last year he will make a study of the strength and proportioning of parts to withstand the stresses to which they will be subjected in the finished machine.

First Year

First Semester	Second Semester
#Mechanical Drawing 1	#Mechanical Drawing 2

Second Year

#Elementary Mechanics 206a	#Elementary Mechanics 206b

Third Year

#Mechanism 208	#Strength of Materials 207

Fourth Year

#Machine Design 209a	#Machine Design 209b

INDUSTRIAL TECHNOLOGY

For those who plan to enter one of the numerous fields of industrial work, a general training is necessary. This course in Industrial Technology has been planned to give this general training. It will also prove of value to men who are now employed in the various industries as foremen or in similar positions. Satisfactory completion of the course plus adequate practical experience will qualify the student for work in a supervisory capacity.

A University Extension Certificate is given for the successful completion of the course.

First Year

First Semester	Second Semester
Engineering Problems 212a	Engineering Problems 212b
Business English 700	Report Writing 213

Second Year

Mechanics 206a	Strength of Materials 207

Third Year

Drawing 1	Drawing 2

Fourth Year

Public Speaking 7	Factory Management 601
Time and Motion Study 250a	Materials of Construction 210

Meets twice a week.

LIBERAL EDUCATION

The University of Wisconsin Extension Division in Milwaukee has expanded the facilities for adult education by offering, without paralleling the usual college subjects, a series of courses aiming to give the foundation of a liberal education. The courses are on a college or university plane, but no credit towards a degree is involved. The program is in line with the most recent experiments in this type of education in Europe and America.

The underlying principles and aims of the series of Liberal Education courses may be summed up as follows: To give an opportunity for adults to acquire an education which involves more than the obtaining of information and skill—an education which will lead to emancipation from a "drifting with the group" opinion; an education which will engender capacity for self-criticism; and above all, an education which will create a feeling for those things that make life richer and more significant.

The requirement for a certificate in Liberal Education is twelve semester courses. Credit towards a certificate will be given to students who have attended the courses with reasonable regularity and have passed the examinations with a satisfactory grade. **Anyone wishing to take the semester examination should notify the instructor well in advance.** If students present credit for work done at other colleges or universities, such credit may be applied in part fulfillment of the requirement for a certificate.

Ability to carry a course and to profit by it is the only requirement for admission.

Courses in Liberal Education may be chosen from the following fields:

Philosophy Group I	Philosophers from Plato to the Present Day Modern Ethics Thinking
Social Science Group II	Social Problems Our Economic Organization Problems in Government International Relations Introductory Psychology Psychology of Human Behavior Child Psychology Abnormal Psychology
History Group III	Ancient Civilizations Medieval Civilizations Contemporary Civilizations European Influences upon American Life and Institutions History of Religions

Language-Literature Group IV	The Story of Language The Bible as Literature Masterpieces of Foreign Literatures in English Translations English, Irish, and American Poetry from the Beginning of the Nineteenth Century Shakespeare and His Contemporaries Modern American and English Novelists and Dramatists
Art Group V	Appreciation of Painting and Sculpture Appreciation of Music Photography
Biological and Physical Sciences Group VI	Zoology Botany Eugenics Astronomy Chemistry Anthropology Geology Geography
Home Interests Group VII	The Relation of Good Nutrition to Health Home Planning and Decorating Home and Community Health Textiles—Attractive and Appropriate Clothing

In addition, any course listed under Letters and Science, Business, or Engineering may be elected for credit toward a certificate in Liberal Education.

For descriptions of courses in Liberal Education, see bulletin of Evening Classes.

DESCRIPTION OF COURSES

BUSINESS

M. R. Schnaitter, M.A., Associate Professor of Economics, Chairman
H. R. Doering, B.A., M.B.A., Assistant Professor of Business Administration
Harry L. Kunze, M.A., J.D., C.P.A., Assistant Professor of Accounting; in charge of Accounting Courses

The following full-time members of the Extension Division Staff devote a part of their time to Business Courses.

H. R. English, M.A., Professor of Business Administration
Lester F. Brumm, B.A., M.S., Associate Professor of Business Administration
John J. Creamer, B.A., LL.B., Associate Professor of English
Mary R. Babcock, M.A., Assistant Professor of English
James H. March, B.A., M.B.A., C.P.A., Assistant Professor of Accounting
Raymond H. Myers, M.A., Assistant Professor of Speech
Lynn E. Baker, Ph.D., Instructor in Psychology

Part-Time

Ferdinand Aumueller, Instructor in Advertising
Prisca Batz, B.E., Instructor in Secretarial Training
Ralph J. Book, B.A., Instructor in Accounting
Russell A. Clark, B.A., LL.B., Instructor in Real Estate Law
Daniel G. Dittmer, M.A., Graduate Assistant in Psychology (Madison)
Henry C. Fuller, Sr., C.L.U., B.A., Instructor in Life Insurance
Phil P. Hayes, Instructor in Real Estate
C. A. Holmes, Instructor in Salesmanship
Richard W. Husband, Ph.D., Assistant Professor of Psychology (Madison)
Floyd E. Jenkins, B.A., LL.B., Instructor in Business Law
Charles J. Jens, B.S., Instructor in Insurance
H K. von Kaas, B.S., Instructor in Factory Management
William F. Koch, B.S., Instructor in Insurance
Robert F. Marty, Instructor in Property Management
William M. Metzker, B.A., Instructor in Accounting
Charles Misko, Illustrator, Chicago; Lecturer in Commercial Art
Harrison Saudek, Instructor in Real Estate Appraisals
Milo F. Snyder, B.S., Instructor in Accounting
Leonard E. Zastrow, C.P.A., Instructor in Accounting

Additional instructors to be appointed.

The following descriptions cover courses which may be given during the evening. For time, fee, and instructor, consult schedule, which will be issued each semester.

(‡) Indicates certificate credit.

ACCOUNTING

‡1. Introductory Accounting.

The elementary principles of bookkeeping and accounting are developed rapidly in this course. The practical application of fundamental principles and methods is emphasized by problem work. The subject matter includes: debit and credit; journals; ledgers; controlling accounts; the balance sheet; and the income statement. No knowledge of bookkeeping or accounting is required for entrance. In order to carry on the work satisfactorily, the student will need to spend considerable time on each assignment outside of the classroom.

‡2. Introductory Accounting.

This is a continuation of Accounting 1 and is intended for those who have completed that course or its equivalent. The course deals with the accounting problems of the various forms of business organization; manufacturing accounts; voucher systems; and business papers and documents. A partnership set, a corporation set, and other exercises are covered.

‡3. Intermediate Accounting.

This is the first half of the course in intermediate accounting. It is not a bookkeeping course. Problem material is assigned which requires a thorough foundation in the subject. A study is made of the following topics: single entry; classification of accounts; adjusting entries; working papers; statements; corporation accounting; actuarial science; receivables; inventories; consignments; and installment sales.

Prerequisite: Accounting 2 or its equivalent.

‡4. Intermediate Accounting.

This is a continuation of Course 3. The topics covered are: tangible and intangible fixed assets; securities; fixed liabilities; current liabilities; funds and reserves; comparative statements; ratios; book value; accounting for variation in profits; and the statement of application of funds.

‡5a. Auditing.

The work of the auditor is a specialized function requiring skill and responsibility. Enrollment for this course requires a thorough knowledge of accounting principles and practice, equivalent to the completion of Accounting 4. Some of the topics treated are: how to begin an audit; division of work between junior and senior accountants; branch auditing; auditing from trial balance and from original records; auditing asset accounts; auditing liability accounts; practical application of principles by a study of actual cases.

‡5b. Auditing.

The following topics are treated: preparation of working papers; opening and closing an audit; audit reports; duties and responsibilities of the auditor; office methods; scope of investigations; analysis of earnings and expenses;

system of accounts; and reorganizations. A large number of comparatively short problems are assigned for solution which illustrate a wide variety of situations encountered in audits.

Prerequisite: Auditing 5a or its equivalent.

‡9a. Cost Accounting.

Dealing chiefly with manufacturing costs, this course covers the following topics: cost classification; cost statements; controlling accounts and subsidiary records for inventories, labor, and overhead; factory ledger; voucher register; payroll distribution; other cost journals and analysis sheets; job-order and process cost procedures.

Prerequisite: Accounting 2 or the consent of the instructor. Candidates for the extension certificate in accounting are advised to complete Accounting 3 and 4 also before enrolling in this course.

‡9b. Cost Accounting.

A continuation of Course 9a, using the same text, this course deals more intensively with problems of accounting for overhead; accounting for joint costs; standard costs; and budgets. Selling and administrative as well as manufacturing costs are considered. Emphasis is given to the managerial uses of cost data.

Prerequisite: Accounting 9a or the consent of the instructor.

‡11. Advanced Accounting Problems.

In this course practice is given in analyzing and solving C.P.A. and other advanced problems. A study is made of partnerships; venture accounts; insurance; bankruptcy; statement of affairs; realization and liquidation account; branch accounting; and estates and trusts. Considerable attention is given to consolidated statements. Students should have had at least Accounting 4, before enrolling in the course.

‡12. Accounting Problems Under Social Security Laws.

This course treats of the practical application of the Wisconsin Unemployment Compensation Act and the Federal Social Security Law. The topics treated are as follows: preparation of contribution reports; unemployment benefit claims; returns under the Federal Social Security Act for unemployment compensation and old age benefit tax; and a complete description of available forms and records required by both the state and federal government.

‡46. Analysis of Financial Statements.

This course is provided for executives, investors, lawyers, and others who are primarily interested in analyzing and interpreting the operating and financial facts of a business. The following topics are treated: construction of the balance sheet and profit and loss statement; analysis of working capital and fixed assets; interpretation of balance sheet changes; and analysis of the income statement. Statements of railroads, public utilities, banks and mercantile, manufacturing, mining, insurance, and holding companies are studied.

Some training and experience along accounting lines are desirable but not required.

This course may be applied toward the certificate program of the National Institute of Credit.

‡134. Governmental Accounting.

Dealing chiefly with municipal accounting procedure, this course covers the following topics: general characteristics of the accounts of governmental units; expendable revenue funds; budgets; appropriations, encumbrances, expenditures, and disbursements; revenues and receipts; bond funds; special assessment funds; sinking funds; trust funds; stores and service department funds; capital outlays; and funded debt. Account classifications for cities and counties which have been developed by the Municipal Accounting Division of the Wisconsin Tax Commission are discussed, and questions on governmental accounting from the Wisconsin C.P.A. examinations are studied.

Prerequisite: Accounting 2 or its equivalent and preferably Accounting 3, 4, and 9a also.

‡143. Retail Accounting.

The accounting and budgeting control problems peculiar to retail stores are covered in this course. Organization and management problems, where they affect the making of the records and their interpretation, are also considered.

Prerequisite: Accounting 2 or its equivalent, or consent of the instructor.

‡135S. C. P. A. Review.

This course is designed for advanced students, and particularly those who are preparing to take the examinations for the Certified Public Accountant's Certificate. Problems and questions which have been selected from Wisconsin and other state C.P.A. examinations are assigned at each meeting. The solutions and the accounting principles involved are fully discussed in class. Emphasis is placed on the method of attacking problems and on the proper presentation of work done.

This course is customarily given each year, starting in July and ending in November.

‡402a. Income Tax Procedure.

The laws and regulations covering income taxes are treated in detail. Their application to the various classes of taxpayers is illustrated by practical problems. The course is designed for those who are not familiar with tax procedure. It is open to students who have had a thorough training in accounting theory and practice and to others with the consent of the instructor.

‡402b. Advanced Problems in Income Tax Accounting.

This course is open to those who have completed Course 402a or its equivalent. It is also open to accountants and lawyers who have had some income tax experience and wish to become familiar with the latest Act, current regulations, and recent rulings. The course deals largely with the Federal Law, but comparisons are made with the Wisconsin Income Tax Law. The chief differences between the two laws are pointed out. Consideration is given to planning business transactions and recording them so as to facilitate the preparation of tax returns and supporting schedules.

For University credit courses in Accounting, see page 80.

BANKING AND FINANCE

‡137. Management Finance.

A study is made of the method of financing a going concern by the issue of stocks, bonds, short time notes, and the use of bank loans. From this point, inquiry proceeds into the financial problems of promotion, combination, merger, insolvency, receivership, and dissolution. Attention is given to safeguards against financial losses, including insurance and accounting control, and to causes of business failure and methods of reorganization.

Note: This course should precede Investments, which is offered the second semester.

‡403. Investments.

The principal objective of this course is to equip the student with certain principles which will aid him in the investing of his own funds or the funds of others. The work begins with an outline of economic fundamentals as applied to the field of investments. Standards are developed by which securities may be measured, and application of these standards is made to the formulation of an investment policy for the individual, for the corporation, and for the institution. Individual securities are examined in the light of these principles, and typical investment accounts are constructed.

The course is recommended for Examination V (Finance) of the C. L. U. Examinations.

‡186. Banking and Credit.

The major portion of the semester is devoted to a practical consideration of commercial banking as carried on under the Federal Reserve System, including a study of the following: bank credit, commercial paper, acceptances, rediscount rates, call loans, note issues, reserves, and clearings. Considerable attention is devoted to the analysis and interpretations of bank statements. The course concludes with a discussion of what might be called recent economic tendencies in banking, such as: consolidations, branch banking, state and federal legislation, control through the Federal Reserve System, and a survey of the differences between the banking system of the United States and the system of several foreign countries.

‡401. Credits and Collections.

The National Association of Credit Men has established a National Institute of Credit, which awards Junior and Senior Certificates to those who have satisfactorily completed a group of related courses as described on pages 35 and 36 of this catalog.

The course in Credits and Collections is one of the courses required for a certificate.

Among the topics covered are: credit work as a profession; the economics of credit; the organization of a credit department; special and general mercantile agencies; other sources of credit information; investigation of credit risks; tactfully refusing credit; analysis of financial statements; instalment credit and collections; collecting by telephone and personal contact; collection psychology; credit and collection letters; the follow-up technique;

locating "skips"; insolvent debtors; adjustment bureaus; and legal aspects of credit and collections.

‡**404. Stock Market Analysis.**

Men and women who wish to learn the most up-to-date forecasting technique developed by leading authorities will be interested in this course. Among the topics covered are: technical, manipulative, and psychological factors; business "fundamentals" vs. market structure; mechanical forecasters; types of movements; resistance and turning points; out-of-line movements; perspective, figure, area, percentage, and wave charts; moving averages; Dow theory; head and shoulder structures; market strategy; protective rules; selecting individual issues; and forecasting practice.

‡**405. Stock Market Analysis, Advanced.**

Those who have taken Course 404, Stock Market Analysis, are eligible to enroll for this advanced work. Others are also eligible with the approval of the instructor.

A critical examination is made of the more advanced methods used by leading authorities. Each member of the group is encouraged to develop his own powers of analysis.

Practical Business Statistics, see page 57.

Analysis of Financial Statements, see page 44.

BUSINESS ENGLISH AND BUSINESS CORRESPONDENCE

‡**700. Business English.**

This course is designed for business people who desire to improve their knowledge of spoken and written English. It includes the study of the fundamental rules governing correct English usage, sentence structure, paragraph structure, common grammatical errors, the use and abuse of slang, and the form and composition of a good business letter. The course serves as an introduction to the course in Business Correspondence.

‡**702a. Business Correspondence.**

The aim of this course is to provide practice in correct business letter writing. The course trains students to write more clearly, concisely, correctly, and forcefully. Actual business letters are analyzed for the essential qualities of business writing. Special emphasis is placed upon sales letters and letters of application.

‡**702b. Business Correspondence.**

This course is a continuation of Course 702a and deals largely with human-interest messages found in adjustment letters, credit letters, and collection letters. Some time is spent in covering business reports.

Prerequisite: Course 702a or its equivalent in study and experience.

BUSINESS LAW

‡**101. The Law of Contracts and Agency.**

The major portion of this course is devoted to a study of the law of contracts, particularly the formation of contracts, operation of contracts, dis-

charge and enforcement of rights under contracts. The relation of principal and agent and the effect of agency relation are made a part of the course.

This course and Courses 102 and 103 are recommended for those intending to take the examination for the Certified Public Accountant Certificate.

It is also recommended for Examination IV (Laws, Trusts, and Taxes) of the C.L.U. Examinations.

‡102. The Law of Business Transactions.

The two subjects outlined below are presented in this course:

Sales of personal property: characteristics of personal property; transfer of title; express and implied warranties; delivery and acceptance; rights and duties of buyer and seller; and the Uniform Sales Act.

Negotiable instruments: types of negotiable instruments; form and content; negotiation; presentment; notice of dishonor and protest; rights of holders; and liability of parties.

‡103. The Law of Business Organization.

Course 103 deals chiefly with partnerships and corporations and their respective legal advantages and disadvantages as business organizations. The uniform partnership act and the Wisconsin corporation laws are fully discussed. Some time is given to recent laws covering the reorganization and dissolution of business organizations.

‡104. The Law of Wills, Trusts, Estates, and Real Property.

The course offers a background in the law of wills and estates; ownership and transfer of real property; and trusts, including the validity of trusts as governed by the rule against perpetuity.

The course is recommended for Examination IV (Laws, Trusts, and Taxes) of the C.L.U. Examinations.

GENERAL ECONOMIC AND SOCIAL PROBLEMS IN BUSINESS

‡355a. Business Economics.

A course in business economics is essential to an understanding of modern business, as well as being necessary as a foundation in business training. This course will appeal to men and women in all fields or departments of finance, manufacturing, distribution, or public utilities. Particular attention is given to current economic trends, to illustrative material based on business experience, and to the practical phases of the subject. Those who are preparing for C.P.A. examinations will be especially interested. Mimeographed copies of economics questions asked in recent Wisconsin C.P.A. examinations are furnished each student.

‡355b. Business Economics.

This is a continuation of Business Economics 355a.

Emphasis is placed upon fundamental economic principles, with special application to modern trends and practical business problems. Some of the topics discussed include: prices, the business cycle, business forecasting, the security markets, governmental finance, inflation, and improving our economic system.

‡**357. Social Security Legislation.**

Business executives, social agency officials and workers, office managers, accountants, those in charge of pay-roll records, and others who have charge of the administration of unemployment insurance and workers' retirement taxes will be interested in this course. Citizens who desire to keep abreast of the latest trends in social security, for their own information, will also be interested.

Real Estate Economics, see page 55.

Purchasing Principles and Practices, see page 53.

INSURANCE

800. Casualty Insurance.

This course is intended for casualty and surety agents who desire further technical knowledge of the business. It is presented from the agent's viewpoint and is designed to aid him in his production and to furnish information enabling him to solicit all of the coverages which he has available. A study is made of each of the casualty and surety lines, the computation of rates, underwriting and selection of risks, and practical aids to selling and solicitation.

810. Property Insurance.

Course 810 is recommended to underwriters, salesmen, and office employees of fire insurance companies and agencies. The course is concerned with the development of property insurance as adapted to American conditions. It includes a brief history of the business, an analysis of prevailing contracts with their essential features, together with discussion of such items as voidances, cancellations, modifications of standard policies, loss adjustments; and the use of standard forms in different states.

801. Principles of Life Insurance.

Upon the successful completion of this course students are prepared to take the examinations given by the Life Office Management Association Institute, as outlined in its Course Number 1.

Others who may not wish to take the L. O. M. A examinations may enroll in the course for the purpose of improving their general knowledge of life insurance fundamentals.

Among the topics discussed are: history of life insurance; types of companies; plans and uses of insurance; annuities; mortality tables; premium rates; reserves; dividends; policy contracts; special forms of insurance; selection of risks; insurance investments; annual statement; organization of life insurance companies; home office organization; governmental supervision and taxation of life insurance; legal phases of life insurance.

802. Advanced Life Insurance.

The L.O.M.A. includes six examinations in its advanced course. The Extension Division usually covers the work of the advanced course over a two-year period. During a given year it will offer, for example, the material included in Examinations 5, 6, and 7. During the following year it may offer

the subject matter covered by Examinations 8, 9, and 10. For further information, the prospective student should consult the semester bulletins issued by the Extension Division or confer with the instructor.

The topics covered by the six examinations are: life insurance accounting; interpretation of annual statement; life insurance investments; agency organization; governmental supervision and taxation; legal aspects of life insurance.

803. Life Insurance Salesmanship.

The first part of the semester is devoted to the principles of salesmanship; the last part is devoted to the psychology of life insurance salesmanship, analysis of sales interviews, general principles underlying selling, strategy of selling.

For courses recommended for Examinations IV and V, see pages 48 and 46.

804. Life Insurance Fundamentals.

This course covers: the nature of life insurance and the basic principles underlying it; family and personal uses of life insurance; investment service of life insurance; business uses of life insurance, with special reference to close corporations and partnerships; classification of policies; annuities; settlement options; the science of life insurance; measurement of risk; principles of rate making. Special attention is also given to professional programming of life insurance and to estate conservation.

NOTE: Life Insurance Fundamentals can be pursued with profit by the layman who is not selling insurance but is interested in it from a business, financial, or protection standpoint. Courses 803 and 804 can be taken by those who cannot qualify for the C. L. U. Designation but who wish to improve their knowledge and ability in the insurance field.

MANAGEMENT

‡350. Business Management.

A broad view of modern business organization and management is gained from this course, which covers the activities, problems, and interrelationships of the principal departments of a business enterprise. Especial attention is given to the basic principles upon which every successful business is built. The point of view is primarily that of the practical business man. By giving the student a better insight into the activities and problems of the various departments of a business, the course should increase his usefulness to his company.

Among the topics discussed are: forms of business organization; initiating an enterprise; organization of the sales, finance, production, personnel, and accounting departments; planning and operating problems involved in manufacturing, selling, and financing; risks of business and ways of meeting them; business failures, their causes and prevention; interrelationships of departments.

‡351. Personnel Management.

The handling of personnel and labor relations is covered in this course. Some of the principal purposes of a modern personnel department are to increase efficiency, raise the morale of the organization, and develop co-operative

and fair-minded relations between the employees and the executives. The methods used to achieve these purposes are discussed, as are the problems of collective bargaining under the national and state labor relations acts.

Among the topics discussed are: selection of employees; job analysis, description, and classification; education and training methods; service rating; wage plans; promotion and transfer policies; handling discipline; service functions; promoting health and preventing accidents; building morale; collective bargaining.

‡601. Factory Management.

Coordination of the factors of production by careful planning is a central theme of this course. Men who are holding or preparing for executive positions in industry will find it a practical study.

The following topics are discussed: management organization; plant location; equipment layout; standardization and simplification; inspection; inventory control; routing, scheduling, and dispatching work through the factory; time and motion study; wage incentives; cost standards; budgetary control.

‡507. Retail Store Management.

The rapid changes which are taking place in the field of retailing make it absolutely necessary that the independent merchant in the relatively small store know more about his business than ever before. He must know what to watch, how to control the merchandising activities in his store, and by what methods he can make sure of operating his store at a profit. This course is organized with those purposes in view. It does not include the complicated methods of large store operation. It shows how small stores can use good merchandising methods without increasing costs.

Among the subjects discussed are: layout; display; mark-up; expense control; avoiding wastes; advertising; salesmanship; credits and collections; meeting competition.

Each member of the group has an opportunity to work out the problems which affect his own organization. In this way, as well as through the group discussions, he gets definite, practical help from the course.

Time and Motion Study, see page 68.

MARKETING AND ADVERTISING

‡500. Salesmanship.

Selling knowledge means success for the individual and the organization. This course analyzes the work of the salesman and explains modern methods of increasing sales. Closing the sale is given special attention. Other topics are: dealing with competition; qualifications of the salesman; psychology of the sales process; organizing and working a territory.

‡501. Marketing Practice.

The sales strategy and the trade channels used in distributing consumer goods from the manufacturer to the final user are discussed in this course. The marketing of agricultural products is not included; the marketing of industrial machinery, equipment, supplies, and raw materials is treated briefly.

Among the topics covered are: the characteristics, strength, weaknesses, and special problems of independent stores, department stores, corporate chains, voluntary chains, mail-order houses, house-to-house selling, and consumers' co-operatives; the services and limitations of wholesalers and functional middlemen; choosing a method of distribution; selective selling; price policies; the Robinson-Patman Act; price control and the "fair-trade acts"; buying and turnover; expenses, profits, and losses in marketing; ways of reducing market costs; and finding market information.

The course is particularly helpful to those engaged in sales and advertising.

‡509. Industrial Marketing.

The problems of sales strategy and trade organization involved in marketing industrial machinery, equipment, parts, and supplies are dealt with in this course.

Among the topics covered are: analyzing industrial markets; finding the industrial buyer; industrial buying motives and practices; product policies; channels of distribution for industrial products; manufacturers' agents, sales agents, machine tool dealers, and distributors; advantages and disadvantages of direct selling; public warehouses in industrial marketing; the sales organization; sales aids; price policies; selective selling; consignment selling; leasing arrangements; free service; trade-ins; industrial advertising policies; industrial advertising media; relations with advertising agencies; and industrial marketing costs.

‡511. Commercial Art.

The subjects covered in this course lay a foundation of purpose in developing talent, producing individuality, creating original ideas, and mastering mediums of presentation and technique.

The student may apply his training in a practical way in many fields where artistic ability and originality are in demand. He will be helped in determining his choice among the following branches of Commercial Art: Lettering, Layouts, Design, Fashion, Illustration. He is urged to progress as rapidly as his ability permits and to develop his own individual style.

‡502. Advertising Principles.

This course is intended for the beginner in the advertising profession. It gives the student a thorough grasp of advertising principles and of the various steps in the preparation of advertisements and advertising literature. Time is devoted to planning and writing copy, making layouts, and producing advertisements through the steps of art work, engraving, typography, and printing. The various advertising mediums such as magazines, newspapers, trade papers, radio, direct mail, and outdoor mediums are discussed. The course is helpful to those who expect to enter the advertising profession as a life's work and also to the busy executive who appreciates the advantages of knowing more about advertising.

‡504. Advertising Campaigns.

In Course 504, a continuation of Course 502, the various forms of advertising are correlated into complete campaigns. At least three campaigns are

developed: one of national scope on a product appealing to the general public; an industrial campaign intended to sell a product for use in industry; and a retail campaign or one devoted to selling a service rather than a product. Copy is developed, layouts are planned, mediums are selected, and schedules are arranged as nearly as possible as is done in an advertising department or agency. Although many students have completed this course satisfactorily without prior training or experience, the completion of Course 502 or some experience in the advertising field is recommended.

‡508. Purchasing Principles and Practices.

The purpose of the course is to present and exchange ideas that will be of practical value to those in industry or government who have a general or a professional interest in purchasing. It is sponsored by the Milwaukee Association of Purchasing Agents.

Among the topics discussed are: purchasing procedure, functions, and control; sources of supply and their selection; purchase budgets and accounting; market analysis; traffic and tariffs; legal aspects of purchasing; quotations, specifications, orders, and inspection; governmental and railway purchasing; specialization in purchasing: raw materials, operating supplies, machinery and equipment, maintenance and repair materials, office equipment and machines, office supplies, and printing.

PSYCHOLOGY

‡196. Business Psychology.

How may the laws of human nature be used in dealing with people in business? In discussing this question the course deals with such topics as the following:

Vocational Guidance: basic principles in choosing a vocation; the use of psychological tests and occupational analyses; preventing "misfits."

Industrial Psychology: the interview; the value and limitations of psychological tests in selecting employees; job analyses; rating scales as a basis for promotion; industrial relations from the point of view of the worker and from the point of view of the employer.

Psychology Applied to Salesmanship and Advertising: finding the customer's wants; motivation; sales appeal; helping the customer to buy; answering objections; closing the sale; reason why vs. emotional appeals in advertising; psychology in relation to advertising technique.

For other courses in Psychology, see page 100.

REAL ESTATE

‡306. Fundamentals of Real Estate Practice.

Real estate values compose nearly half of our national wealth. They are constantly changing, as they are affected by population growth, industrial development, and environment. This is the first course of the program of real estate education sponsored by the Milwaukee Real Estate Board and the National Association of Real Estate Boards.

The discussion includes the following topics: the real estate market; the value of real estate; apartments and business structures; industrial property; city planning; forecasting city growth; finding property and prospects; financing real estate transactions; building and loan associations; mortgages; real estate brokerage; managing a real estate office.

‡308. Real Property Law and Conveyancing.

The course covers the basic principles of the law of contracts with particular emphasis on contracts relating to real estate. It includes the law of principal and agent in its relation to the real estate broker, the various kinds of estates and titles, and the importance of abstract or title insurance. The listing contract, option, deed, mortgage, land contract, and lease are treated as well as the manner of executing such instruments. Certain court actions, as "action to quiet title" and the foreclosure of mortgages, are considered during the progress of the course.

‡309. Real Estate Financing.

This course is especially useful to real estate brokers and salesmen, to officers and employees of banks, investment houses, mortgage companies, and building and loan associations. It includes practical information on the financing of homes, small stores, industrial sites, office buildings, subdivisions, and apartment houses; the sources of funds for real estate loans; sound appraisal methods; choosing of profitable sites; financial houses furnishing real estate funds, their requirements, organization, and methods of operation; forms of real estate credit; mortgages, land contracts, bond issues, and participation certificates; ground rent systems and long-term leases; and the part played by building and loan associations in financing home ownership.

‡310. Real Estate Appraisals.

Correct appraisals are essential to success in the real estate business. This course emphasizes the economic theory of scientific appraising as well as its practical application to every form of real estate appraisal. The topics discussed are: the relation of zoning and land restriction in the appraisal of real estate; obsolescence and depreciation in residential property; how building costs affect value; the theory of appraising on an income basis. Lectures together with some field work cover the appraisals of the following types of property: vacant residential buildings; a moderately priced home; apartment houses; a combination store, apartment, and office building; vacant industrial property; improved industrial locations; property with misplaced improvements; and lands taken in condemnation proceedings.

‡311. Real Estate Selling.

Real estate selling is no longer a haphazard process. It has become a scientific procedure. The salesman must be prepared to sell the services of the realtor and of his own organization and to analyze the realty he is to sell and the market for it. He must be able to carry out his firm's selling policies and to cooperate with its advertising. Finally, he must understand the actual steps in making a sale. In covering these subjects, this course helps

not only the salesman to make sales, but it also aids him in progressing toward sales management and eventually a business of his own.

‡312. **Property Management.**

The task of the property manager is to get the greatest possible return from property by putting it to the best possible use. As a merchandiser of space he will first study the possibilities of a location, whether the ground floor space, for example, is most suitable for a restaurant, a drug store, or a men's clothing store. Having determined what the building is most logically suited for, he will develop a renting campaign to secure tenants.

The present day building manager is informed about the characteristic features of office buildings, apartment houses, stores, and other types of income-producing property. He knows how to make suitable arrangements of floor space and how to provide proper light, heat, and ventilation. He knows what type of service his tenants need and expect. He is familiar with the most efficient maintenance methods and with the less complicated, but important, tasks of collecting rents, keeping accounts, and directing a clerical staff.

This course has been developed to meet the needs of those who have property management problems. It should be of interest to real estate men; building managers; officers of banks, trust companies, and insurance companies; lawyers who have been charged with the management of estates; and large property managers.

‡313. **Real Estate Economics.**

More than 56 per cent of the people of the United States now live in cities, and almost four-fifths of the workers of America are engaged in non-agricultural occupations. The growth of cities has been so rapid that the nation has not adjusted itself to urbanization.

The growth of cities, the location and migration of industries, and the movements for centralization and decentralization are covered in this course. A study is made of public and private uses of land within cities and the way in which these uses may be directed and controlled through planning and zoning. The public aspect of housing and housing programs is given much consideration. The course directs attention to the interrelation of the city with its hinterland; to the special problems of the region about the city; to the problem of city expansion, transportation, and recreation; and to the overlapping governmental units which complicate the problem. Since four counties in southeastern Wisconsin have absorbed half of the increase of the state's population in the last thirty years, special attention is given to the urbanization and land use problems of this area.

Property Insurance, see page 49.

SECRETARIAL TRAINING

‡714. **Secretarial Training.**

The duties required of a secretary to the business man and the professional man are outlined. Instruction is given in the performance of such

duties, together with practical problems selected to train the student in the basic principles associated with secretarial work. The course is planned to assist stenographers and office workers who desire to advance into secretarial work, and to give secretaries additional experience in handling varied executive duties.

Considerable time is devoted to the subject, the development of an ideal personality. Other subjects studied are: secretarial duties and requirements; secretarial standards in correspondence; composition of simple business letters; use of reference books; indexing and filing; meeting callers and handling business appointments for the executive; itineraries; reports; and graphs.

Shorthand dictation practice is optional.

SPEECH

‡7. Beginning Public Speaking.

This is a practical course to help business and professional men and women in their speaking, both in public and in private. A maximum of platform work is required of each student. The theory offered is applied, immediately, to actual speaking situations. The course is designed to teach the individual to prepare and deliver speeches creditably.

9. Parliamentary Practice, see page 103.

‡707. Advanced Public Speaking.

Course 707 is a continuation of Speech 7. Principles of speech psychology are tested out in class speaking, and each student receives individual guidance in refining his all-round ability as a speaker. Special occasion speeches, such as the introduction, presentation, acceptance, and welcome speech, are also studied.

Prerequisite: An elementary course in Speech or consent of instructor.

‡708. Persuasive Speaking.

This course, to follow 707, is planned for those students desiring to develop their skill beyond the standard required for reasonable success on the platform. Principles of persuasion are studied, and students are guided in their efforts to apply the principles in platform speaking.

Prerequisite: Speech 707 or consent of instructor.

‡710. Radio Speaking.

Lab. fee, $2.25.

This is a practical course designed to give the student a maximum amount of microphone speaking and studio experience. Every student has an opportunity to study and practice radio announcing, studio directing, script-writing, and script-reading. Original programs are prepared, rehearsed, and broadcast. Each student makes two recordings, which become his property.

Prerequisite: An elementary course in Speech or consent of instructor.

For other courses in Speech, see page 103.

STATISTICS

‡139. **Practical Business Statistics.**

The application of facts and figures to the practical problems of business management is emphasized. Among the topics discussed are: sources of business information; construction of charts; uses and limitations of business forecasting; the barometers of the statistical services; interpretation of statistical data.

ENGINEERING AND TECHNICAL SUBJECTS

William J. Fuller, B.A., Professor of Civil and Structural Engineering, Chairman

Harry T. Avey, M.E., Associate Professor of Mechanical Engineering; in charge of Mechanics and Machine Design

Herbert W. Wesle, B.S., Associate Professor of Topographic Engineering; in charge of Railway and Topographic Engineering Courses

Leo S. Baldwin, B.A., B.S., Assistant Professor of Drawing; in charge of Drawing Courses

C. L. Dean, B.S., Assistant Professor of Mechanical Engineering (Madison and Milwaukee)

Hiram E. Grant, B.S., Instructor in Mechanical Drawing

Part-Time

E. A. Abendroth, B.S., Instructor in Structural Engineering

George Abendroth, B.S., Instructor in Strength of Materials

Roland Amundsen, B.S., Instructor in Mechanical Drawing

R. O. Bernauer, B.S., Instructor in Diesel Engines

Alvin E. Ericson, B.S., Instructor in Radio

Carl J. Fechheimer, B.S., M.E., Instructor in Symmetrical Components

Robert D. Junge, E.E., Instructor in Electrical Problems

E. A. Longenecker, B.S., Instructor in Time and Motion Study

Arnold Meyer, B.S., Instructor in Welding

S. A. Mollica, B. S., Instructor in Mechanical Drawing

Carl Oestreich, B.S., Instructor in Civil Engineering

Norman Schober, B.S., Instructor in Mechanical Drawing

George Spinti, A.I.A., Instructor in Architectural Design

Walter Veenendaal, A.I.A., Instructor in Architectural Drawing

C. A. Wiepking, B.S., C.E., Instructor in Mechanics

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule, which will be issued each semester.

(*) Indicates university credit.
(‡) Indicates certificate credit.
I. Course given first semester.
II. Course given second semester.

ARCHITECTURAL AND BUILDING

‡1a. Architectural Design.

Design, in so far as it should indicate the character of the building, whether political, religious, or domestic, is taken up in this course. Good design requires grace of form, articulation of parts, proportion and emphasis, these qualities all being dependent upon outline, mass, color, and detail. It comprises the use of both Greek and Roman Periods and the Periods that follow, in conjunction with building design.

‡1b. Architectural Design.

Course 1b is a continuation of the first semester's work. It is open to new students who are properly prepared.

Prerequisite: Course 1a or its equivalent.

‡243a. Architectural Drawing.

Besides dealing with the subjects of drawing as applied to architectural work, this course affords much valuable information on details of building construction and architectural practice. The draftsman is given practice in the design of details of a moderate sized house from which he makes drawings. These cover such details as walls of various types, sash, casement, door head, floors, stair sections, fireplaces, heating and plumbing layout.

‡243b. Architectural Drawing.

In the second semester the student is required to make drawings of a small house beginning with sketch plans and elevations at ⅛ inch scale. Special attention is given to the proper presentation of these drawings. Working drawings of plans and elevations are then made at ¼ inch scale followed by ½ inch scale drawings of stairway, fireplace, cabinets, and the full-sized details that are required to complete the house.

Prerequisite: Course 243a or its equivalent.

‡497a. Estimating for Builders.

The practical methods of estimating used by builders and contractors are taught. Instruction is given in the reading of blueprints and designs. Plans for small buildings are furnished, and the student carries through a systematic estimate of all material and labor quantities. He is instructed to use judgment in estimating the quantities of brick, lumber, glass; to make proper allowance for unavoidable waste in construction; to analyze cost data for similar work and arrive at certain unit costs; to make the proper tabulations in order to arrive at the direct cost.

‡497b. **Estimating for Builders.**

The subject matter of this course is confined to reasonably large buildings of reinforced concrete, steel, and wood. The work of the semester is directed to the preparation of quantity surveys and to the estimate of the labor required for the different types of construction. A complete set of blue prints, together with the specifications of some large buildings in Milwaukee, is acquired by the student.

Prerequisite: Course 497a or its equivalent.

CHEMISTRY

2a. General Chemistry.* I, II. **4 credits**

Two hours lecture; two hours recitation; four hours laboratory.

Lab. fee and deposit, $12.50.

The course in general inorganic chemistry begins with the study of non-metals and of the fundamental principles of chemistry.

The topics covered are: kinetic theory of gases; oxygen; hydrogen; water; the halogens; halogen acids; chemical theories and laws; chemical equations and calculations; ozone; hydrogen peroxide; acids; bases; salts; the atmosphere; ammonia; nitric acid and other nitrogen compounds; sulphur and sulphuric acid; carbon compounds.

In the laboratory, the important non-metals are studied. Attention is given to bleaching agents; common acids of commercial value; ammonia and other common bases; neutralization; purification of water.

2a. General Chemistry.* (Special) I. **4 credits**

Two hours lecture; two hours recitation; four hours laboratory.

Lab. fee and deposit, $12.50.

This course is designed especially for chemical engineers who desire technical training in the chemical and related sciences. The properties and reactions of certain metals and non-metals are studied with emphasis on the mathematical application of the fundamental laws and theories.

2b. General Chemistry.* II. **4 credits**

Two hours lecture; two hours recitation; four hours laboratory.

Lab. fee and deposit, $12.50.

A study is made of the inorganic chemistry and qualitative analysis of the common elements. Special emphasis is given to the principles underlying the analytical procedures.

Prerequisite: Chemistry 2a.

2b. General Chemistry.* (Special) II. **4 credits**

Two hours lecture; two hours recitation; four hours laboratory.

Lab. fee and deposit, $12.50.

This course is intended for chemical engineers. A study is made of the physical and inorganic chemistry of the common metals. The laboratory work consists of Qualitative Analysis that is used to illustrate the properties of some of the compounds of certain of the metals.

14. Quantitative Analysis.* I. **3-5 credits**

Three or four credits, lab. fee and deposit, $17.50; five credits, lab. fee and deposit, $22.50.

Chemistry 14 is a course in the essentials of quantitative analysis. The student analyzes naturally occurring ores and commercial materials.

Prerequisite: General Chemistry, including qualitative analysis.

20 and 21. Organic Chemistry*, see pages 78 and 79.

DRAWING

Architectural Drawing, see page 59.

‡1. Elements of Mechanical Drawing.* I, II. **3 credits**

Laboratory fee, $1.00.

Topics treated: theory of orthographic projection including auxiliary views; reading problems; isometric drawings; freehand sketching; technique of making mechanical drawings; vertical lettering. (Only actual machine parts used as problems.)

‡2. Elements of Mechanical Drawing.* I, II. **3 credits**

Laboratory fee, $1.00.

Topics treated: problems involving the conventional representation of all kinds of threads, springs, fillets, rounds; use of irregular curve; technique of drawing engineering graphs; delineation; thorough study of the form, spacing, selection, location, and decimal limit for dimensioning; sketches of actual machine parts, followed by detail drawings, assembly drawing and tracing; blue printing; design layouts. American Standards Association's conventions and standards used throughout the course. (Only actual machine parts used as problems.)

Prerequisite: Drawing 1 or equivalent in commercial drafting room experience.

(Courses 1 and 2 may be elected for credit by students in the College of Letters and Science.)

3. Descriptive Geometry.* I, II. **3 credits**

Laboratory fee, $.50.

Topics treated: fundamental theory of point, line, and plane, with application to solids; generation of lines and surfaces; tangent planes; sections, intersections, and developments. A large number of the problems used are practical problems in the various fields of engineering, selected so as to correlate the theory with practical applications.

Prerequisite: Drawing 2 or equivalent in commercial drafting room experience.

ELECTRICAL

6a. Vacuum Tubes and Their Industrial Applications. I.

Laboratory fee, $.50.

During the first semester the student learns the fundamentals about vacuum tubes. Knowing the fundamentals, he should be able to design

simple control circuits containing vacuum tubes. Many problems are worked out by the student throughout the course.

A knowledge of the fundamental laws governing the flow of the electric current is required. Students should also have at least a working knowledge of trigonometry.

6b. Vacuum Tubes and Their Industrial Applications. II.

Among the topics treated are the following: the tubes as detector; plate and grid detection; various types of vacuum tube voltmeters; vacuum tube wattmeters; the influence of grid current on d.c. amplifiers; photo-cells and their characteristics; amplifiers for photo-cells; the tube as generator of a.c. of any frequency (oscillator); multi-vibrators; tube circuits operating from a.c. lines directly (photo-relays, capacity relays); gaseous tubes; thyratrons and some of their uses; cathode ray tubes and their applications.

213a. Elementary Problems in Electricity.

The course includes electric and magnetic circuits; also a treatment of the more common electrical measuring instruments. Classroom and home study problems are used extensively to make the students familiar with the subject. The course is a problem course in electricity; although a knowledge of the calculus will clarify some of the derivations, it is not necessary.

Prerequisite: Trigonometry and the equivalent of electricity as covered in high school physics.

348a-b. Symmetrical Components.

(Applications to the Solution of Alternating Current Problems)

The introductory topics treated are: short history, laws of complex numbers, conjugates and operators, resolution of three vectors into their symmetrical component systems, independence of sequence voltages and currents in systems having balanced impedances, determination of sequence quantities, measurement of sequence voltages and currents, power, power-factors and their measurement.

The applications to apparatus cover induction motors with unbalanced primary voltages, single phase induction motors, induction motors with polyphase primary and single phase secondary, slip ring induction motors with unbalanced resistances in secondary, synchronous machines and their various reactances, the time constants of the various short circuits on synchronous machines, and phase balancing methods.

The applications to systems cover calculations of transmission lines, circuit reduction, and the various kinds of faults of systems.

This is largely a lecture course, but a text is used.

Prerequisite: Graduation from a recognized engineering college or consent of instructor.

360. Selected Topics in Electrical Engineering.

This course is offered for electrical engineers. Many who have become specialized in one subject should be interested in obtaining a broader knowledge by studying a number of electrical problems from various fields.

The following is a list of topics covered: Wheatstone bridge and the fallacy of equal resistances in its branches from maximum sensitivity; alternating current bridges; Schering bridge; Anderson bridge; Maxwell method of cyclic currents for bridge and other networks; bridges with non-linear elements and their applications for voltage regulation; power factor; circuits with no reactance, yet having power factor less than unity; alternating current vector diagrams; inversion; the general equation of the circular diagram and some applications of the latter; half- and full-wave rectifier circuits containing inductance and capacity; fundamentals of transients.

It is hoped that the above list will be augmented by problems encountered by members of the class.

Prerequisite: Mathematics, including calculus; knowledge of fundamentals of electrical engineering and of representation of alternating currents by complex quantities.

GEOGRAPHY

Geography 7 and 8 are consecutive introductory courses in geography; together they form a unit of work for one year. They are offered to engineering students desiring a general cultural background of world geography without laboratory training.

7. Regional World Geography: Natural Aspects.* I. **2 credits**

A survey is made of those natural features of the earth which affect its usefulness to man. Climates, land forms, and natural resources are studied from the standpoint of their distribution and of their relation to man's activities. A brief survey follows of the great geographic regions into which the world is divided. The course is open to freshmen.

8. Regional World Geography: Cultural Aspects.* II. **2 credits**

The first part of this course treats principally of the various raw materials of the world. The distribution and importance of each are emphasized. The second part treats of the various political and natural divisions of the world. Special emphasis is placed on North America, although the resources and development of each country are briefly noted. The course is open to freshmen.

No prerequisite; Geography 7 recommended.

MACHINE DESIGN

1. Machine Design* (Mechanism). I. **4 credits**

Among the topics treated are: motion and velocities, instantaneous centers, relative linear velocities, velocity diagrams, cams, gearing, and belting.

Prerequisite: Mechanical Drawing 1 and 2.

2. Machine Design Practice.* II. **1 credit**

This is a short course treating of the practical considerations of machine design. Study is made of the use and application in design of engineering material, formulae, and tabulated data, together with a discussion of factor of safety and allowable stress.

Prerequisite: Machine Design 1.

‡208. Mechanism. I. (Two evenings a week.)

Mechanism is the study of the motion of the parts of a machine and is sometimes called "the geometry of machinery." Only such mechanisms are studied as are of practical application. Mechanics, strength of materials, and machine practice are introduced only so far as is necessary to the thorough understanding of the mechanism studied.

The subjects studied include linkages, cams, gears, belts, wrapping connectors, and intermittent motions.

Since much careful drawing is required in the course, a good set of drawing instruments is necessary.

Prerequisite: Drawing 1 and Algebra and Trigonometry or their equivalent.

‡209a. Machine Design. (Two evenings a week.)

The principles of mechanics, mechanism, and strength of materials in the design of machine parts are studied in this course.

Introducing the subject, such topics as materials, loads, stresses, factor of safety, elastic limit, modulus of elasticity, and moment of inertia are studied. Typical elements of machines used as examples in applying principles are: beams; columns; rivets and riveted joints; screws and bolts; keys; lubricating devices; bearings; belt and rope drives; toothed gearing; friction clutches and brakes; shafting; springs; cylinders; and plates.

Prerequisite: Mechanics 206a and 206b or equivalent.

‡209b. Machine Design. (Two evenings a week.)

The subject matter of the course covers the following general topics: design of shafting under various conditions of loading, concentration of stress in fillets, and fatigue of metals due to varying stresses; strength of spur, bevel, and worm gears; friction brakes, friction clutches, friction wheels, belt drives, and rope drives; design of machine frames for strength and rigidity; design of flywheels for inertia, capacity, and strength; stresses in thick cylinders; stresses due to force fits; a brief consideration of the static and inertia forces in connection with rotating and reciprocating machine parts; safety engineering in design.

A selection of suitable problems accompanies the above theory.

Prerequisite: Machine Design 209a.

‡212a. Elementary Engineering Problems (algebra and trigonometry). See below.

212b. Advanced Engineering Problems (analytics and calculus). See page 65.

MATHEMATICS AND ASTRONOMY

‡212a. Elementary Engineering Problems (algebra and trigonometry).

The purpose of this course is twofold:

First, to provide practice in analyzing simple problems of an engineering nature.

Second, to provide the foundation of elementary mathematics required for the solution of such problems.

The mathematics used is elementary algebra, geometry, and trigonometry. The problems for analysis and solution are of the type frequently met in surveying, in machinery operation, in heating and ventilating, in refrigeration, and in the design of simple structures and machines. The importance of the habitual use of clear-cut sketches as the basis of analysis is emphasized. Orderly and accurate written solutions are required. Constant use of the slide rule is an essential of the course.

Prerequisite: Working knowledge of elementary algebra.

‡212b. Advanced Engineering Problems (analytics and calculus).

This course is planned to meet the needs of draftsmen and designers who desire a reading and working knowledge of mathematics beyond their present foundation of algebra and trigonometry. Almost all familiar handbook formulas in daily use are based on comparatively simple physical laws. In developing these principles and putting them into working form, methods of analysis and reasoning common to higher mathematics are made use of.

It is the purpose of this course to combine the processes of mathematics and the materials of familiar engineering problems in a series of practical procedures from physical principles to handbook formulas.

Prerequisite: Elementary Engineering Problems 212a.

50. Subfreshman Algebra. I. **No credit.**

The topics covered include square root, quadratic surds, solutions of quadratic equations, simultaneous equations involving quadratics, logarithms, progressions, and the binomial theorem. The course is required of all students who do not pass the examination given to all freshman engineers.

51. Elementary Mathematical Analysis.* I, II. **5 credits**

This course is required of all freshmen in engineering. Applicants for admission are required to pass an examination in algebra, given shortly after the opening of the semester.

The course includes: functions; rectangular coordinates and the straight line; the power functions; the circle and the circular functions; ellipse; hyperbola; single and simultaneous equations; permutations and combinations; binomial theorem; progressions. A thorough review is given at the close. The course gives prominence to the fundamental ideas of elementary analysis. Graphing is emphasized.

52. Elementary Mathematical Analysis.* I, II. **5 credits**

Course 52, Elementary Mathematical Analysis, is regularly required of all freshmen in Engineering and is a continuation of Mathematics 51. The course covers: logarithmic and exponential functions with applications; trigonometric equations and the solution of triangles; simple harmonic motion and waves; complex numbers; locus problems; and a brief treatment of conic sections.

Prerequisite: Mathematics 51.

53. Elementary Mathematical Analysis.* I. **5 credits**

Course 53 is open to all freshmen who have had four semesters of high school algebra and one semester of trigonometry and who have shown spe-

cial ability in mathematics. Inasmuch as Mathematics 51 and 52 include approximately a semester's work in algebra and trigonometry, the omission of these subjects in this course makes it possible to cover the remaining subjects of Mathematics 51 and 52 and to prepare the student for the calculus in one semester. In effect, this gives the student five hours for additional electives, which may profitably be used in obtaining a more advanced mathematical training for engineering.

54. Differential and Integral Calculus.* I, II. **4 credits**

All Engineering sophomores are required to take this course.

Content of course: review of functions and processes taken up in Mathematics 51 and 52; the derivative, its meaning and application; limits; the power function; differentiation of algebraic functions; second derivative applications; infinitesimals; definite integrals; circular functions; inverse circular functions; exponential and logarithmic functions; maxima and minima; polars; integration.

Prerequisites: Mathematics 51 and 52 or their equivalent.

55. Integral Calculus.* I, II. **4 credits**

This course is required of all sophomore engineers and is a continuation of Mathematics 54.

Content of course: advanced integration; successive integration; center of gravity; moment of inertia; curvature; series; total derivatives; exact differentials and a brief introduction to differential equations.

Prerequisite: Mathematics 51, 52, and 54, or their equivalent.

Note: Mathematics 54 and 55 may be taken by Letters and Science students instead of Mathematics 5.

110. Higher Mathematics for Engineers*.

Course 110 is designed primarily for engineers, but it may be taken profitably by anyone who wishes an introduction to the fields of applied mathematics beyond calculus. The course is given in three parts, a, b, and c, each covering one semester's work. Any one of these parts may be taken independently of the others. Day school students are not advised to enter this course unless they plan to take all three units.

Prerequisite: Calculus.

110a. **2 credits**

Elliptic integrals, solution of equations, determinants and matrices, infinite series.

110b. **2 credits**

Partial differentiation, Fourier series, line integral, ordinary differential equations.

110c. **2 credits**

Partial differential equations, vector analysis, probability.

111. Review of Calculus. **No credit**

Engineers and other persons engaged in technical work often find that they have forgotten many of the elements of the calculus which they learned

in college. This course is designed for such persons. It provides a review of the fundamentals of differentiation and integration, and includes the application of these processes to engineering and practical problems. It may be taken with the consent of the instructor by students who have not had a course in the calculus.

112. Differential Equations.* II. **3 credits**

This course provides a thorough introduction to the study of the solution of the ordinary and partial differential equations. Special attention is paid to the applications of differential equations occurring in engineering, physics, and geometry.

Prerequisite: Calculus.

117a-b. Vector and Tensor Analysis.* Yr. **4 credits**

Course 117 begins with a brief discussion of vector analysis, including vector algebra, and the elements of vector calculus and some applications.

Following the treatment of vectors the idea of tensors is introduced; tensor algebra and tensor calculus with applications in the treatment of Euclidean and non-Euclidean manifolds are discussed.

The course is of special interest to engineers, physicists, and others who have occasion to read current technical literature in which the tensor notation and tensor ideas are used freely. It may also be taken by mathematics or mathematics-physics majors and minors.

Prerequisite: Calculus.

Astronomy

6. Navigation.* II. **2 credits**

The course is designed for students who wish an elementary course in practical astronomy or who wish to become familiar with the methods by which the position of a ship at sea is determined. Some of the subjects taken up are: instruments used in navigation; latitude by Polaris; latitude by a meridian altitude of the sun; azimuth; longitude by a time sight of the sun or a star; the method of Marc St. Hilaire; the line of position; and modern methods in practical navigation.

Prerequisite: Trigonometry.

MECHANICAL AND INDUSTRIAL

‡223a-b. Heating, Ventilating, and Air Conditioning.

This course is offered, primarily, for architects, architectural draftsmen, engineers, contractors, estimators, and others who feel the need of a practical course which will help them to plan, estimate, and install heating and ventilating systems in the various types of buildings. It is, however, of value to anyone interested in heating and ventilating problems.

The work of the course contains many calculations, and, therefore, a good knowledge of elementary mathematics and the ability to use simple formulas are required. Much time and work are saved if the student is able to use the slide rule.

The work of the complete course extends through both semesters.

‡222. **Refrigeration.**

This is an elementary course and is planned for a thorough study of the fundamental principles of refrigeration. For the student who has had no instruction or experience in refrigeration it provides a good foundation for advanced study. The course should also prove interesting to those who feel the need of a review of the fundamental principles of refrigeration.

The work is based on a standard text. Mimeographed material used in the course is supplied by the Extension Division.

The work of the course contains many calculations and, therefore, a good knowledge of elementary mathematics and the ability to use simple formulas are required. If the student can use the slide rule, he can save much time in making the many calculations involved.

‡231. **Fuels and Combustion.**

The course in Fuels and Combustion offers instruction on the fundamental principles and practices of burning coals and other fuels effectively and efficiently in the furnaces of factory and industrial power plants, as well as in domestic plants.

The work is of special interest and value to firemen, engineers, superintendents and managers of factory and industrial power plants, to fuel dealers and salesmen (industrial and domestic), to boiler and furnace salesmen (industrial and domestic), to students of power generation and development, and to all those interested in the utilization of fuels.

The course consists of regular class meetings conducted on the lecture and round-table plan with ample time for the discussion of all questions. The regular work is supplemented by the use of slides and films, the distribution of suitable literature, and a class question box.

237. **Thermodynamics.**

(Heat: laws of behavior; carriers; processes and apparatus for changing heat into useful work.)

The course offers an opportunity for the study of the nature of heat and its carriers, and practice in applying the basic principles involved in the generation and control of heat in its uses for power purposes.

The work of the course includes the solution of many problems. A good foundation in algebra and trigonometry is essential.

‡250a-b. **Methods Engineering (Time and Motion Study).**

Course 250a is designed primarily for those who are interested in learning to apply the basic laws of motion economy. The fundamental principles of motion study are presented through classroom discussions together with moving pictures filmed before and after motion study analysis has been made. Emphasis is laid on the distinction between efficiency and final economy. Working formulas are presented to enable the motion study man to determine readily the amount of time and money which may be justified in the improvement of a specific job. The technique of time study is presented as a tool to be used in connection with motion study. Practice is given in timing operations and in computing piece rates. Uses of time study in connection with estimat-

ing and the establishment of the most economical dimensional tolerances are stressed. Students are encouraged to present problems for class solution.

Course 250b is a continuation of Methods Engineering 250a given during the first semester. It consists of lectures and class discussions, time and motion study problems, wage payment plans, product and process analysis, economic considerations governing the purchase of equipment, production control, the relation of production quantities to costs, plant layout, materials handling, waste reduction, and other allied phases of industrial engineering work with which the person in charge of production methods should be familiar.

220a. Diesel Engines.

Course 220a is offered especially for those who desire to obtain instruction on the fundamental principles of the modern Diesel engine, as well as an understanding of some of its constructional features and operating problems. Although the course is a beginning one on the subject Diesel engines, prospective students should have a good working knowledge of algebra in order to do the work in a satisfactory manner. Experience in the internal combustion engine field will be given special consideration towards meeting the requirements for entrance. All students should consult the instructor at the first meeting regarding eligibility for the course. In some cases, an entrance examination will be given.

220b. Diesel Engines.

This is a continuation of Course 220a. As in the first semester, special attention is given to the high-speed automotive type. Various designs are studied as to their construction, principles of operation, economic aspects, and as to their applications to trucks, tractors, railtrams, and locomotives.

274a. Metallurgy.

Course 274a is an elementary course to aid apprentices and others in an understanding of this important field. The course is theoretical and includes information on the making, shaping, and treating of metals. Men in any branch of the metal industry should profit by the course. The subjects covered include: iron, steel, cast iron, malleable iron, graphite steels, aluminum, copper, zinc, lead, brasses, and bronzes.

274b. Metallurgy.

Course 274b is a continuation of the work given during the first semester. The various topics already considered are expanded by treating them not only in greater detail but also by showing the relationship in metallic alloys as a whole. With the approval of the instructor, students properly prepared may take Course 274b without having had Course 274a.

MECHANICS AND MATERIALS

1. **Statics.* I.** First half semester **3 credits**
Prerequisite: Physics 51.

2. **Dynamics.* II.** Second half semester. **2 credits**
Prerequisite: Mechanics 1, enrollment in or completion of Mathematics 55.

‡206a. **Elementary Mechanics (Statics). (Two evenings a week).**

Through the course in statics the student acquires a knowledge of the fundamental facts and theories as well as the ability to apply this knowledge to practical problems. The course is of value to the shopman, draftsman, and designer. It must be completed before any of the design courses are taken up. The application of forces to cranes, derricks, and trusses is covered both graphically and analytically.

Among the topics treated are: concurrent forces; equilibrium; resultant and components; non-coplanar forces; types of trusses; loadings; and friction.

Prerequisites: Algebra and trigonometry.

‡206b. **Elementary Mechanics (Dynamics and Properties of Materials). (Two evenings a week.)**

This is a continuation of Course 206a given in the first semester. The subjects studied in this course are: motion and forces that produce changes in motion; moment of inertia; radius of gyration; work; power; energy; friction; general laws of machines; elasticity and its relation to the strength of beams, columns, and shafts. Consideration of all these subjects as they arise in different aspects in design is given in the solution of many practical problems.

Prerequisite: Course 206a or equivalent.

‡207. **Strength of Materials. II. (Two evenings a week.)**

Course 207 is intended for those who aspire to be machine designers or structural or architectural draftsmen. The student should have a good working knowledge of arithmetic, elementary algebra, and the rudiments of trigonometry. He should be familiar with the use of the slide rule and have one of the standard steel handbooks for reference.

Topics treated: properties of materials; simple stresses; elastic properties; cylinders, pipes, and riveted joints; center of gravity and moment of inertia; beams, reactions; shear; bending moments: columns; general reference tables.

Prerequisite: Elementary Mechanics 206a.

‡210. **Materials of Construction.**

This course deals with the preparation, manufacture, properties, and uses of the more common construction materials.

Topics covered: timber, pig iron, cast iron, wrought iron, steel, non-ferrous materials, alloys of non-ferrous materials, and miscellaneous materials.

‡213. **Report Writing.**

Various topics are assigned by the instructor to individual students. The student writes a report, which is discussed in class and then corrected before it is returned to the student.

PHYSICS AND RADIO

51. General Physics.* I. **5 credits**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

Mechanics, heat, magnetism, and static electricity are taken up in this

course. The course is required of civil, mechanical, and chemical engineers.

Prerequisite: Students must have completed or be taking Mathematics 52.

52. General Physics.* II. **5 credits.**

Two hours lecture-recitation; two hours quiz; four hours laboratory. Lab. fee, $7.

Current electricity, sound, and light are treated in this course. The course is required of civil, mechanical, and chemical engineers.

Prerequisite: Physics 51 and Mathematics 54 or concurrent registration in Mathematics 54.

119. Radiation, Ultraviolet to Infrared,* see page 100.

Radio

1. Principles of Radio Communication.

Dealing with the simplest fundamentals of electricity and magnetism, this course serves as an excellent review for former students of electricity, and provides a foundation for those beginning the study of radio. The subjects given special attention in this course are: electrons; Ohm's law; series and parallel circuits; power and energy; measurement of resistance; theory of motors and generators; batteries; inductance; transformers; coupled circuits; capacitance and its measurement; instantaneous, average, and effective values of current and voltage; phase relation between current and voltage; vector diagrams; capacitive and inductive reactance; impedance; series and parallel circuits; power factor; resonance; properties of coils and condensers in radio use; and high low and band pass filters.

2. Principles of Radio Communication.

Vacuum tubes and their applications are studied in this course. A good knowledge of D.C. and A.C. theory on the part of the student is required. The theoretical consideration of the following topics is thorough but without reference to actual commercial circuits or applications: properties of filaments and cathodes; electron emission; 2, 3, 4, 5, 6 element tube; class A, B, C amplifiers; dynamic characteristics of tubes; undistorted output; power supplies for vacuum tubes; oscillators; detectors; magnatrons, thyratrons, and a consideration of elementary types of receivers—regenerative, tubed radio frequency neutralized, superregenerative, hetrodyne, superhetrodyne, and reflex.

Time is given to a consideration of circuits of the following commercial equipment and applications: Transmitters (code, radiophone, broadcast, and airplane); broadcast and commercial receivers and special circuit variations in various manufactured equipment. There is opportunity at each meeting to discuss problems and topics pertaining to Federal Radio Communication Examinations.

9. International Morse Code.

Drill in sending and receiving and training in message forms and "Q" signals are given in this course. Traffic handling and government regulations are also discussed.

The work of the class is so organized that both beginners and advanced students can get training in receiving at various speeds.

RAILWAY ENGINEERING

1. Railway Curves.* I. **2 credits**

The computation and field location of simple, compound, and spiral curves, and of railway turnouts are covered in this course.

Prerequisite: Trigonometry and Elementary Surveying.

2. Route Surveying.* I. **3 credits**

The following topics are treated in this course: principles underlying the location of railways, highways, canals, and pipe lines; alignment, including locating of grade contour; gradient, including vertical curves; estimates, including earthwork computations and mass curve.

Prerequisite: Course 1 or concurrent registration.

SPEECH

8a. Extempore Speaking.* I. **2 credits**

Speech 8a is an elementary course specifically outlined for freshman engineers. It is required of electrical engineers. The course offers a maximum amount of practice in effective organization and presentation of speech material. Emphasis is placed upon gaining freedom of expression and achieving power to think before an audience. A detailed study is made of the speaker, audience, material, and the importance of speaking for a definite purpose.

8b. Extempore Speaking.* II. **2 credits**

Speech 8b is a continuation of Speech 8a. It is planned for freshman engineers.

The purpose of the course is to give the student increased proficiency in the organization and expression of thought. The speech projects consist of a detailed study and presentation of speeches of explanation, action, introduction, presentation, acceptance, welcome, farewell, and response.

Prerequisite: Course 8a.

STRUCTURAL

‡417a. Reinforced Concrete. (Two evenings a week.)

The fundamentals in the design of slabs, beams, and columns are covered in this course. Some of the topics treated are: aggregates; proportioning; design of concrete mixtures; quantities of materials; strength; steel and concrete in combination; flexure formulas; working stresses; diagonal tension; bond stress; designs of simple beams with tension reinforcement; design of slabs, T-beams, and beams with steel top and bottom; design of columns reinforced with bars only and of columns with both bars and spiral reinforcing.

Prerequisites: Course 206a and 207 or their equivalent.

‡417b. Reinforced Concrete. (Two evenings a week.)

Course 417b, a continuation of Course 417a, applies the theory to the design of various structures. The topics treated are: general types of con-

crete floors; floor loads; economic considerations; small openings; roofs; columns; bearing walls; retaining walls; window openings; basement walls; stairs; and foundations. Numerous designs are worked out and drawings made.

Prerequisite: Course 417a or equivalent.

‡450a. Structural Theory.

This course is intended for those who have learned the principles of designing in a preliminary structural course such as 207, or have had equivalent training. The student is taught the design and assembly of a complete structure. The course should be of interest to those who wish to obtain their architect's license, or to those who wish to become draftsmen or to improve their ability as draftsmen.

A complete set of plans showing a two-story steel frame factory building is furnished the student. All of the necessary members are shown, but no sizes are noted. As the design progresses details are made of the various members in accordance with standard shop practice. At the completion of the course, the student is provided with a complete set of notes as a permanent record of this work.

The texts required for the course are the *Handbook of the American Institute of Steel Construction* and *The Wisconsin State Building Code.*

Prerequisite: Strength of Materials 207.

‡450b. Structural Theory.

Course 450b is a continuation of Course 450a. In this course interest is centered on the various types of truss framed roofs instead of on beam framing. Two complete structures are designed: the first, a garage with a book tile or gypsum roof and brick walls; the second, a sheet-metal warehouse.

The student again receives drawings showing these buildings, and is taught how to design and detail the various members. At the completion of the course, a complete set of notes is provided for the student to supplement his class notes.

The texts for the course are the same as those for Course 450a.

Prerequisite: Structural Theory 450a.

‡450c. Structural Theory.

Instead of working out a complete building design as he did in the previous courses, the student will consider a number of special problems. These problems include: the design of girders for different loadings; the design of truss and girder splices; eccentric connections; special end-connections for beams and grillage foundations. Shop drawings are made in each case. The textbooks are the same as those required for Course 450a.

‡450d. Structural Theory.

This course, like Course 450c, consists of a number of special problems. These problems include: coal hoppers, water tanks; hip and valley details; wind brackets and bents; towers and columns under eccentric loads. The student is required to make complete designs of the different structures as

well as the necessary shop drawings. Textbooks are the same as those required for Course 450a.

452. Continuous Frames.

This course deals primarily with the theory of continuous frames with special reference to building construction. The requirement for admission is a general knowledge of the design of simple structures and of reinforced concrete members.

The course includes: the development of the fundamental theory of continuity; simple problems to give facility in the application of the theory; the design of the structural framework of a reinforced concrete building.

276a. Welding Design and Practice.

Course 276a is intended primarily for men supervising, inspecting, or designing welded joints or connections. It should, however, prove of value to welding operators or others who have an interest in welding.

276b. Welding Design and Practice.

Among the subjects discussed are: building codes, bridge codes, and vessel codes. The following subjects as related to welding are also covered: structural steel design, the reinforcing of structural steel structures already in use, and the design of machine elements. The student is required to solve numerous problems. Students who are qualified may take this course without having had Course 276a.

Prerequisite: Strength of Materials.

Materials of Construction, see page 70.

SURVEYING, SEE TOPOGRAPHIC ENGINEERING

TOPOGRAPHIC ENGINEERING

(See Also Railway Engineering, page 72)

1. Elementary Surveying.* I. **2 credits**

Lab. fee, $4.50.

The theory and practice of pacing, taping, and leveling are studied in this course.

2. Elementary Surveying.* II. **2 credits**

Lab. fee, $4.50.

Classroom work and field practice in the use and adjustment of the engineer's levels, surveyor's compass, and transit are dealt with in this course.

Prerequisite: Course 1.

3. Land Surveying.* I. **3 credits**

Lab. fee, $3.

Content of course: theory and field practice in the use of transit, sextant, and plane table, in problems relating to land surveying; the effect of lack of adjustments; instrumental inaccuracies and their elimination; methods used in original land surveys, city surveys, and resurveys. The field work is fol-

lowed by office practice in computations arising from common surveying problems, in plotting field notes, and in making maps.

Prerequisites: Course 2 and Trigonometry.

104. Advanced Surveying.* II. **3 credits**

Lab. fee, $4.50.

The following topics are taken up: mining, topographic, and hydrographic surveying, stream gaging, and field astronomy; field practice in solar and stellar observations, topographic surveying, and mapping. (Completion of this course admits the student to the University of Wisconsin Summer Survey Camp.)

Prerequisite: Course 3.

108. Short Course in Surveying.* II. **3 credits**

Lab. fee, $4.50.

This course is planned to meet the needs of students in mechanical and electrical engineering for a general study of surveying. It may also be taken by students in mining engineering and some other courses. It includes topographic, hydrographic, and land surveying, with field practice in the use of tape, level, and transit.

Prerequisite: Trigonometry.

LETTERS AND SCIENCE

The following descriptions cover courses which may be given during the day or evening. For time, fee, and instructor, consult schedule, which will be issued each semester. Courses marked with an asterisk (*) involve credit toward a university degree. "Sophomore standing" means 25 credits and 25 grade points.

I. Course given first semester.

II. Course given second semester.

ART HISTORY AND CRITICISM

Ruth G. Reinert, Ph.D., Instructor in History

22. Elements of the Fine Arts.* I, II. **3 credits**

This is a survey course which covers the field of art, architecture, sculpture, and various of the minor arts from pre-historic times through the modern period. An analysis is made of the conditions—local, general, personal, and technical—that give rise to architectural, sculptural, and pictorial art expression. The lectures are illustrated with slides.

Prerequisite: Sophomore standing.

BOTANY

Ruth I. Walker, Ph.D., Associate Professor of Botany, Chairman
Merlin L. Hayes, Ph.D., Instructor in Botany and Zoology

The laboratory science requirement may be removed by taking Botany 1 and Botany 2, or Botany 1 and Animal Biology 1, or Animal Biology 1 and Zoology 104. If Botany 1 and Animal Biology 1 are chosen to satisfy the science requirement, either one may precede the other, at the student's discretion.

1. General Botany.* I, II. **5 credits**

Two hours lecture; two hours quiz; four hours laboratory. Lab. fee, $5.00.

The course in General Botany is preliminary to all advanced work. The general make-up of plants is studied with special emphasis on structure, function, development, and heredity. A survey follows of the plant kingdom illustrated by selected types.

2. Advanced General Botany.* II. **5 credits**

Two hours lecture; two hours quiz; four hours laboratory. Lab. fee, $5.00

The lectures deal primarily with the history of the development of the scientific spirit in biology and involve a discussion of modern problems of evolution, inheritance, and variation. The laboratory work of the course is a comprehensive survey of the plant kingdom and includes the use of keys in the

identification of many plants. In the late spring, laboratory work is done in the field.

Prerequisite: Botany 1.

130. Identification and Classification of Seed Plants.* II. **3 or 4 credits**

Two hours lecture-quiz; 4 hours laboratory. Lab. fee, $3.00.

This course consists of a study of the local flora, giving training in identification and classification of higher plants. Field trips for the purpose of collecting and identifying herbaceous and woody plants are held in the late spring.

Prerequisite: Botany 1.

CHEMISTRY

George G. Town, Ph.D., Professor of Chemistry, Chairman
Paul E. Millington, Ph.D., Associate Professor of Chemistry
Victor A. Reinders, Ph.D., Assistant Professor of Chemistry
Earl Amott, Ph.D., Instructor in Chemistry
Melvin A. Goese, M.S., Instructor in Chemistry
Harold H. Snyder, B.S., Instructor in Chemistry
Donald Swalheim, M.S., Instructor in Chemistry

1a. General Chemistry.* I, II. **5 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

The course in general inorganic chemistry begins with the study of non-metals and of the fundamental principles of chemistry.

The topics covered are: kinetic theory of gases; oxygen; hydrogen; water; the halogens; halogen acids; chemical theories and laws; chemical equations and calculations; ozone; hydrogen peroxide; acids; bases; salts; the atmosphere; ammonia; nitric acid and other nitrogen compounds; sulphur and sulphuric acid; carbon compounds.

In the laboratory, the important non-metals are studied. Attention is given to bleaching agents; common acids of commercial value; ammonia and other common bases; neutralization; purification of water.

1a. General Chemistry.* (Special) I. **5 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

This course is designed especially for Chemistry Course (B.S.) students in order to develop technical training in the chemical and related sciences. The properties and reactions of certain metals and non-metals are studied with special emphasis on mathematical application of the fundamental laws and theories.

1b. General Chemistry and Qualitative Analysis.* II. **5 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

A study is made of the inorganic chemistry and qualitative analysis of the common elements. Special emphasis is given to the principles underlying the analytical procedures.

Prerequisite: Chemistry 1a.

1b. General Chemistry.* (Special) II. **5 credits**

Two hours lecture; two hours recitation; four hours laboratory.
Lab. fee and deposit, $12.50.

This course is intended for Chemistry Course (B.S.) students. A study is made of the physical and inorganic chemistry of the common metals. The laboratory work consists of qualitative analysis that is used to illustrate the properties of some of the compounds of certain of the metals.

3. Qualitative Analysis.* II. **1 credit**

One hour lecture-quiz; two hours laboratory.
Lab. fee and deposit, $2.50.

This course is intended to supply more extended training in qualitative analysis than is included in Chemistry 1b or 2b. It is required of all students in the Chemistry Course who are working for a B.S. degree. It is recommended for all students whose courses require additional training in chemistry.

Prerequisite: Concurrent registration in Chemistry 1b or 2b.

11. Quantitative Analysis.* Yr. **3-5 credits**

Three or four credits, lab. fee and deposit, $17.50; five credits, lab. fee and deposit, $22.50.

Chemistry 11 is a course in the essentials of quantitative analysis. The student analyzes naturally occurring ores and commercial materials.

Prerequisite: General Chemistry, including qualitative analysis.

17. Elementary Chemistry.* **4 credits.**

Three hours lecture; two hours laboratory.
Lab. fee and deposit, $6.00.

The general purpose of this course is to familiarize the student with the philosophy of chemistry and its relation to the complex civilization in which we are living. Rather than give the student a transient command of a restricted amount of factual material, this course endeavors to organize and explain the relationships between the phenomena that are concerned with the changes in matter, as these phenomena affect our daily lives. Special emphasis is placed on the modern scientific method of acquiring knowledge about the material universe. The course is intended for those students who are interested in chemistry for its cultural value, and it can not be used as a substitute for Chemistry 1a and 2a. It is not open to those students who have had any previous training in chemistry. If no credit is desired, the laboratory work may be omitted.

20a. Organic Chemistry.* I. **2 credits**

Two hours lecture; one hour quiz.

The course covers the chemistry of paraffin and unsaturated hydrocarbons, carbons, alkyl halides, polyhalogen compounds, alcohols, monocarboxylic acids and their derivatives, ethers, aldehydes, ketones, organic compounds of sulfur, amines, nitro-paraffins, cyanogen and its related compounds, benzene and

its homologues, halogenation and sulfonation of aromatic hydrocarbons, together with an introduction to stereoisomerism and tautomerism.

Chemistry 20a and 21a should be taken concurrently.

Prerequisite: Chemistry 1b or 2b, or equivalent.

20b. Organic Chemistry.* II. **2 credits**

Two hours lecture; one hour quiz.

Chemistry 20b is a continuation of Chemistry 20a, covering derivatives of benzene and its homologues, polynuclear hydrocarbons and their derivatives, polyhydroxy alcohols, polybasic acids, optical isomerism, amino acids, proteins, sugars, starch, cellulose and its derivatives, heterocyclic compounds, synthetic drugs, and alkaloids. Throughout Courses 20a and 20b considerable emphasis is placed upon physiological applications of organic compounds.

Chemistry 20b and 21b should be taken concurrently.

Prerequisite: Chemistry 20a or equivalent.

21a. Organic Chemistry.* I. **2 credits**

Six hours laboratory; lab. fee and deposit, $17.50.

This course includes the preparation and purification of a number of representative and important aliphatic compounds, including ethyl bromide, ether, acetic anhydride, ethyl acetate, soaps, fatty acids, acetone, acetaldehyde, methyl amine, acetonitride, nitrobenzene and aniline. The principles and technique involved in the various processes are stressed.

Prerequisite: Chemistry 20a or its equivalent, or concurrent registration in Chemistry 20a.

21b. Organic Chemistry.* II. **2 credits.**

Six hours laboratory; lab. fee and deposit, $17.50.

Chemistry 21b continues with the more difficult preparation of the benzene derivatives and includes representative dyes, dye intermediates, aromatic alcohols, aldehydes, and ketones. Considerable attention is devoted to the properties of and the tests for proteins, sugars, and starches.

Prerequisite: Chemistry 20b and 21a, or their equivalents, or concurrent registration in Chemistry 20b.

117. Inorganic Preparations.* **2-5 credits**

Two credits, lab. fee and deposit, $12.50; $4.50 per additional credit.

This course covers the fundamental principles of chemical manipulation and advanced general chemistry. The experimental work done gives the student:

First A grasp of the fundamental principles on which chemistry is based;

Second An understanding of the various types of reactions employed in inorganic chemistry;

Third A knowledge of the chemistry of the important types of inorganic compounds;

Fourth Greater familiarity with laboratory technique and apparatus. The discussions and reports familiarize the student with the litera-

ture of inorganic and physical chemistry and assist him in expressing his findings clearly and concisely.

Prerequisite: 1a and 1b or 2a and 2b.

COMMERCE

James H. March, B.A., M.B.A., C.P.A., Assistant Professor of Accounting (Madison and Milwaukee)

Accounting

8. Elements of Accounting.* I. **3 credits**

Course 8 takes up the principles of double-entry bookkeeping; the use of fundamental books; the treatment of and proper statements for sole proprietorship, partnership, and corporation accounts.

Prerequisite: Sophomore standing.

In the College of Letters and Science this course may be counted as part of the credits required for graduation only by the students in the School of Commerce.

9. Intermediate Accounting.* II. **4 credits**

The theories of general accounting with problems to illustrate their application are first considered. Particular attention is given to the preparation and analysis of profit and loss statements and balance sheets.

Prerequisite: Commerce 8 and Mathematics 7.

DRAWING, see page 61.

Economics

M. R. Schnaitter, M.A., Associate Professor of Economics, Chairman
H. R. Doering, B.A., M.B.A., Assistant Professor of Business Administration

1a. General Economics.* I, II. **4 credits**

This course is designed to acquaint the student with the basic characteristics of our modern economic organization. A brief introduction compares our present system with earlier ones, showing how our industrial organization has developed. A study is made of the organization, management, and financial control of corporations and other types of business concerns. Large scale enterprise, corporate securities, and industrial combinations are studied. Labor organization and policies and industrial conflict are examined. Other important subjects covered include money, credit, banking, speculation, insurance, international trade, foreign exchange, and transportation problems.

Prerequisite: Full sophomore standing (25 credits and 25 grade points).

1b. General Economics.* II. **4 credits**

The first part of this course deals with the factors which determine wages, rent, interest, and profits in the business world. Following this comes a study of the causes and effects of business cycles and price changes. The personal distribution of wealth and income is also examined in detail. Attention is given to consumption and the factors affecting consumption and saving. Consider-

ation is given to the problems in the field of public finance, such as taxation, public expenditures, public loans and debts, and to economic policies such as laissez faire, governmental control, protective tariffs, free trade, and the control of industrial combinations.

Prerequisite: Economics 1a.

EDUCATION, see special bulletin.

ENGLISH AND JOURNALISM

Frank M. Hursley, M.A., Assistant Professor of English, Chairman
John J. Creamer, B.A., LL.B., Associate Professor of English
Mary R. Babcock, M.A., Assistant Professor of English
Elisabeth K. Holmes, M.A., Assistant Professor of English
Dudley C. Brooks, M.A., Instructor in English
Edward D. Holst, M.A., Instructor in English
David C. Sheldon, Ph.D., Instructor in English
Gracia E. Torinus, M.A., Instructor in English

18. Grammar and Vocabulary. I, II. **No credit**

The aim of this course is twofold: (1) to enrich the vocabulary of the student; (2) to provide a thorough review of the principles of English grammar. The procedure consists of short lectures on the derivation of words, grammar drill in class, and a study of mimeographed material collected from current writings to illustrate a wide and effective use of words.

A. Fundamentals of English. I, II. **No credit**

This is a course in the fundamentals of writing, with particular emphasis on grammar and correct expression. It is designed for those students whose English is below the standard set for entrance into English 1a. (See the description of English 1a.) The class meets twice a week.

1a. Freshman English.* I, II. **3 credits**

English 1a is required of all freshmen in all colleges of the University. Its aim is to improve the student's skill in writing effective English, in reading accurately, and in understanding how language is used in contemporary life, as in news reporting, editorials, discussions of ideas and affairs, and propaganda. The material in written form and the lectures deal with some of the problems in contemporary American life.

At the beginning of the semester, tests are given to determine whether or not the student is sufficiently prepared to do work of college level; those students who fail to pass the tests will not be allowed to enter English 1a. Such students should take English A.

1b. Freshman English.* I, II. **3 credits**

English 1b is required of all freshmen except those who earned a grade of "A" in English 1a. The material studied includes representative pieces of contemporary American literature.

Prerequisite: English 1a.

2a. Sophomore Composition.* I. **2 credits**

English 2a is a course in imaginative composition dealing particularly with descriptive and narrative writing.

Prerequisite: English 1b or a grade of "A" in English 1a.

2b. Sophomore Composition.* II. **2 credits**

English 2b is a course in expository writing designed to train the student in clear, compact, energetic thinking and writing.

Prerequisite: English 1b or a grade of "A" in English 1a.

30a. Survey of English Literature.* I. **3 credits**

This course (together with 30b) follows the historical plan of study. The selections assigned for reading and study are linked with lectures on the social and literary background from the beginning until modern times. It is designed for students primarily interested in English literature and is recommended for English Majors and Minors. It fulfills the literature requirement for sophomores who are candidates for the B.A. degree. The semester's work covers the period from Chaucer to Dryden.

Either Courses 30a and 30b or Courses 33a and 33b must be taken as prerequisite for all advanced courses in English literature. A student who has a semester's credit in Course 33 may not elect either semester of Course 30.

Prerequisite: English 1b or a grade of "A" in English 1a.

30b. Survey of English Literature.* II. **3 credits**

This is the second semester of a year's course in the historical survey of English literature. It follows the same plan as 30a. The semester's work extends from Swift and Defoe up to nearly the present time.

33a. Introduction to English Literature.* I. **2 credits**

This course is intended for those who wish to increase their appreciation and enjoyment of literature. It is a study of masterpieces in English literature from the sixteenth century to our own time.

English 33a is parallel to English 30a (General Survey) as a prerequisite to advanced courses in English literature. A student who has a semester's credit in Course 30 may not elect either semester of Course 33.

Prerequisite: English 1b or a grade of "A" in English 1a.

33b. Introduction to English Literature.* II. **2 credits**

Course 33b continues the study of English literature begun in the first semester. Although English 33b is a continuation of 33a, it constitutes a distinct unit in itself and may be taken as such by non-credit students.

English 33b is parallel to English 30b as a prerequisite to advanced courses in English literature.

39. The English Novel.* Yr. **2 credits each semester**

This is a year course in the study of the English novel. Wide reading in representative English novelists from Defoe to Hardy and Conrad constitutes the bulk of the student's work. The first semester traces the history of the novel to the end of the eighteenth century; the second semester to the beginning of the twentieth century.

Prerequisite: English 30 or 33.

40. American Literature.* Yr. **2 credits each semester**

The aim of this course is to acquaint the student with representative literature produced in the United States from Colonial times down to the present. In addition to tracing the main currents in American thought and culture, the lectures include biographical studies of the more important authors.

This course should be preceded or accompanied by English 30 or 33.

Journalism

1a and 1b. General Survey of Journalism.* **1 credit each semester**

Practical talks once a week on the character and scope of journalistic work, including a consideration of newspapers, magazines, technical and trade journals, agricultural publications, and advertising, are given. This course is required of freshmen who intend to enter the School of Journalism; it does not count for credit toward graduation from the general courses in Letters and Science.

11. Magazine Writing. **No credit**

The purpose of this course is to give the student basic training in the preparation and sale of non-fiction material for magazines and newspapers. The course is definitely realistic in its methods, since the actual sale of the material produced by the members of the class is anticipated.

17. Problems of Magazine Writing. **No credit**

The purpose of this course is to develop the special abilities of the individuals in the class to meet the needs of particular markets. The course is open to those who have taken the course in Magazine Writing 11 and to others who have the ability to produce marketable non-fiction material.

16. Short Story Writing. **No credit**

An introduction to the literature of short fiction, training in the writing of fiction, and some attention to publication are taken up in this course. Those who wish to enrich their appreciation of fiction as an art may take the course for literary criticism. Beginners in fiction writing are instructed in the finding and development of material and in the elements of fiction writing. Students who have had at least one story published are given instruction in the problems of marketing.

19. Commercial Journalism. **No credit**

The object of the course is to start prospective writers on the road to sales.

The subjects include newspaper features, newspaper serials and short stories, trade journal articles, advertising copy and ideas, magazine articles and short features, film scenarios, contests, and radio scripts and ideas.

Each member receives individual criticism and advice.

For other courses in English, see page 47.

FRENCH, see page 93.

GEOGRAPHY

Ira Edwards, Ph.D., Lecturer in Geography (part-time)
Joe R. Whitaker, Ph.D., Associate Professor of Geography (Madison)

Geography 5 and 6 are consecutive introductory courses in geography; together they form a unit of work for one year. They are intended primarily for students expecting to enter the School of Commerce, and for those desiring a general cultural background of world geography without laboratory training.

5. Regional World Geography: Natural Aspects.* I. **3 credits**

A survey is made of those natural features of the earth which affect its usefulness to man. Climates, land forms, and natural resources are studied from the standpoint of their distribution and of their relation to man's activities. A brief survey follows of the great geographic regions into which the world is divided. The course is open to freshmen.

6. Regional World Geography: Cultural Aspects* II. **3 credits**

The first part of this course treats principally of the various raw materials of the world. The distribution and importance of each are emphasized. The second part treats of the various political and natural divisions of the world. Special emphasis is placed on North America, although the resources and development of each country are briefly noted. The course is open to freshmen.

No prerequisite; Geography 5 recommended.

101. Geography of Europe.* I. **2 credits**

Both the geographic regions and the countries of Europe are dealt with in this course. The outstanding landscape characteristics of the major regions are described and interpreted. There are discussions of the regional physical features, climate, resources, human activities, etc. Both the natural divisions of Europe and the political units (countries) are used as bases of discussion. The aim of the course is to provide a general geographic background of the continent.

Prerequisite: Sophomore standing.

128. Conservation of Natural Resources.* I. **2 credits**

Course 128 deals with the natural resources of the United States—waters, minerals, lands, forests, and wild life—in terms of their character and distribution and with the problems relating to their preservation, utilization, and renewal. Emphasis is placed on current conservation problems of major importance to the people of Wisconsin and to the nation as a whole.

Prerequisite: Sophomore standing or consent of instructor.

GERMAN, see page 89.

HISTORY AND POLITICAL SCIENCE

Hilmar C. Krueger, Ph.D., Associate Professor of History, Chairman
Theodore W. Bauer, Ph.D., Instructor in History
Lee E. Lawrence, Ph.D., Instructor in History and Political Science
Ruth G. Reinert, Ph.D., Instructor in History

The introductory courses 1, 2, 5, and 10 are open to freshmen and may be taken by sophomores. They are all year courses. Students selecting one of them as a freshman requirement must take it for **three credits a semester throughout the year,** or a total of six credits. If they take another as an elective, concurrently with or after the completion of the three-credit course, they must take it for only **two** credits a semester, omitting whatever supplementary work is assigned to the three-credit students. Students not registered in the College of Letters and Science may take any of these introductory courses for two or three credits a semester, for one or two semesters.

1a. Medieval History.* (to 1100) I. **2 or 3 credits**

In this course an attempt is made to show the relationship of the three elements of medieval history: the Graeco-Roman civilization, the Christian church, and the Germanic peoples. The course begins with one element, Rome, already declining; with another, the church, just arising as a political power; and with the Germans, the third element, threatening the Roman frontier. The growth of the church as a cultural and political power forms one development, the advance of the Germans in government and cultural appreciation forms another.

1b. Medieval History.* (1100-1500) II. **2 or 3 credits**

The course begins about 1100 and follows closely the work of the medieval people in the crusades, in commerce and industry, and in the town movement. The intellectual life is seen in the founding of the universities and in the studies pursued in them. Medieval literature, Latin and vernacular, is read, and some architecture is viewed. In the political sphere, the nationalism of France and England, the particularism of Germany, and the resultant conflicts with ecclesiastical and baronial powers find their place. The last four weeks of the course are spent on the Renaissance: political and economic changes, painting and sculpture, literature and architecture.

Prerequisite: History 1a or consent of instructor.

2a. Modern European History.* (1492-1815) I, II. **2 or 3 credits**

Course 2a is a study of the chief developments in European History between 1492 and 1815. It begins with the commercial and religious changes of the fifteenth and sixteenth centuries and closes with the agricultural, industrial, and political revolutions of the late eighteenth century. The development of nation states, the extension of European control overseas, and the establishment of autocratic governments are considered. The course ends with the French Revolution and the spread of revolutionary ideas during the Napoleonic period.

2b. Modern European History.* (1815 to the present). I, II. **2 or 3 credits**

In general this course is an analysis of the factors and circumstances leading to the World War and of post-war problems. The efforts of conservatives

to preserve the class privileges and dynastic organization of eighteenth century Europe against the growing forces of nationalism and liberalism are described. The peculiar problems of each European state are considered in some detail. Attention is paid to the industrialization of western Europe, the appearance of socialism, the competition for markets, the clash of interests in the Balkans, and the extension of the empires of the various nations. The relation of these factors to the World War is considered. Finally, post-war problems and developments are discussed.

Prerequisite: History 2a or consent of instructor.

5a. English History.* I. **2 or 3 credits**

Course 5a begins primarily with the Anglo-Saxon invasion and traces the growth of English institutions to the death of Queen Elizabeth. Stress is given to the contributions of the various peoples migrating to England, and comparisons are made with existing institutions in Europe. The course deals with the life of the people, their religion, government, and social and economic progress. The central theme is to develop an understanding of those factors which aided in the transition of England into a modern state.

5b. English History.* II. **2 or 3 credits**

This course traces the development of English institutions from the accession of James I to the present. Emphasis is placed upon the rise of responsible government and democracy, the industrial revolution, and commercial expansion of the English people. In this connection, political and economic reforms are studied as an indication of the progress of modern England. The formation of the British Empire and growth of imperialism receive attention, especially in view of British participation in world politics.

Prerequisite: History 5a or consent of instructor.

10a. Ancient History.* (Orient and Greece) I. **2 or 3 credits**

The first weeks of this course are devoted to the great Oriental centers, Mesopotamia, Egypt, and Persia, and to minor states like Assyria, Chaldea, and Palestine. The greater part of the semester is devoted to the history of the Greeks. The social and legal aspects of Greek life are studied in the development of the Athenian democracy as well as in the camp of the Spartan soldier; and the cultural development and its culmination in the Periclean Age, as seen in the philosophy and religion, literature and art, receive detailed attention. The course ends with the Post-Periclean Age.

10b. Ancient History.* (Hellenistic Age and Rome). II. **2 or 3 credits**

During the first weeks a study is made of Alexander's conquests and of the results of these conquests.

The last twelve weeks are spent on Rome. Emphasis is placed upon Republican Rome, its expansion over the Mediterranean, its social and economic development, and its ultimate failure. The process of reconstruction in the Empire of Augustus receives considerable attention; the Roman legions are followed to the various parts of the known world, where they built roads and erected temples, aqueducts, and baths, symbols of Roman victory and ad-

vance. Some time is spent on the new element, Christianity, as it grows up. The course ends with the "Decline and Fall of the Roman Empire."

Prerequisite: History 10a or consent of instructor.

4a. History of the United States.* I. **3 credits**

This course traces American development from its colonial beginnings to the Compromise of 1850. After a rapid survey of the colonial period, emphasis is placed on the establishment of the national government and the factors influencing its subsequent evolution. In following the growth of the new nation, attention is focused on the development of national feeling, economic and social life, western expansion and its relationship with the rise of the democratic spirit, and the appearance of sectional discord.

Prerequisite: Sophomore standing, or a grade of "A" or "B" in two semesters of any freshman history.

4b. History of the United States.* II. **3 credits**

This course begins in 1850 and traces the history of the United States to the present. Emphasis is placed on the Civil War, Reconstruction, and the subsequent transformation of the United States from a rural and agricultural society to an urban and industrial one. Attention is given to the rise of "Big Business," agrarian unrest, the Progressive movement, and the rise of organized labor. A significant theme developed is the emergence of the United States as a world power. The closing weeks deal with America's participation in the World War, the post-war events, and the attack of the Democrats on the depression in the New Deal.

Prerequisite: Sophomore standing, or a grade of "A" or "B" in two semesters of any freshman history.

Political Science

7. American Government and Politics (National).* I. **3 credits.**

This course offers an inspection and critical analysis of the chief problems of American national politics. Attention is paid both to functional activities and to the larger issues raised by the efforts of the federal government to deal with the economic crisis. Emphasis is placed upon the social forces which condition or determine governmental forms and actions. It is not open to freshmen.

125. Survey of World Politics.* II. **3 credits**

Course 125 is an analytical introduction to the foundation of international relations. A survey is made of the factors controlling relations among nations: nationalism; imperialism; and racial, populational, and economic problems. A study is made of the settlement of international disputes by war and by methods other than war. Emphasis is placed upon recent and contemporary foreign policies. Although there is a text, assignments are also made in standard general works, official publications, pamphlets, and periodicals.

Prerequisite: Full sophomore standing (25 credits and 25 grade points).

ITALIAN, see page 95.

LANGUAGE REQUIREMENTS

Candidates for the B.A. degree may meet the requirement in foreign language in one of the following ways:

1. By passing examinations in what is known as the intermediate or reading examination in two languages.
2. By passing what is known as the proficiency examination in one language.
3. By securing 32 credits in one, two, or three languages. These credits may be earned partly in high school and partly in the University, or wholly in the University. High-school work is accepted in satisfaction of the foreign-language requirement at the rate of four university credits for one unit, up to the amount of six units, or 24 university credits. A student is not permitted to repeat in college, for credit, the equivalent of a course in foreign language which he has had in high school. Eight credits is the least amount of a single foreign language which will be accepted toward the foreign-language requirement of any course, and if two or three languages are presented, at least 16 credits must be in one language. Students choosing a foreign-language major must present a second foreign language.
4. By passing one intermediate test and by presenting 16 credits additionally.

The student who meets the requirement by examination is still required to earn 120 credits for graduation, but no specified number of credits must be earned in foreign language. A student may at the time of entrance, or whenever he feels properly prepared, take either the reading examination in two languages or the proficiency examination in one language. If he passes, he will be exempt from any further language study, so that the credits which he might have been obliged to earn in language may be earned in other subjects. Languages may, of course, be continued as electives.

The reading examination should be within the ability of the average student who has had two years of the languages concerned in college or two years in high school plus one year in college.

The proficiency examination may be attempted by good students who have had the equivalent of three years of college instruction including a course in conversation.

Content of Examinations

The reading examination will test the student's ability to comprehend prose in the foreign language of about the difficulty of texts now used in the fourth semester. He will also be required to translate a passage from the foreign language into good English and to show familiarity with idioms and vocabulary. In addition the student must demonstrate his ability to pronounce the language by reading a passage out loud in the presence of the examiner.

The proficiency examination in addition to testing the ability to comprehend the printed page will test the student's knowledge of literature and history as related to the language involved. There will also be an oral examination to test the student's ability to understand and answer simple questions in the foreign language.

Arrangements for Examinations

For dates of these examinations, see calendar, page 3. The exact time and place will be announced on the bulletin board.

Students planning to take these examinations should consult Dr. Purin for German, Miss Steinfort for Spanish, and Dr. Young for French. Formal application for permission to take the examinations should be made to the Recorder at times to be announced.

Students who fail may take the examination again, whenever offered.

Ph.B. Degree

The language option for the Ph.B. degree may be met either by examination or by credits earned in college.

B.S. Degree in Education

Those students who expect to enter the School of Education at the end of the sophomore year should be prepared to pass attainment examinations for their language requirement.

LANGUAGES

German and Russian

Charles M. Purin, Ph.D., Professor of German and Russian, Chairman
Frieda A. Voigt, M.A., Instructor in German
Robert H. Weidman, Ph.D., Instructor in German and French

German

1a. First-Semester German.* I, II. **4 credits.**

Training in pronunciation given through oral and aural exercises to insure fluency in reading. A minimum of 500 most frequent words and some 40 of the most frequent idioms to be mastered actively. Essentials of grammar exclusive of the passive voice and the subjunctive. Grammatical topics stressed: declensions, conjugations, case government, and word order. Reading requirements, in English: about 100 pages on Germany and its institutions. Texts read in class: Heath's *Graded German Readers*, Books I-V.

1b. Second-Semester German.* I, II. **4 credits**

Grammar essentials reviewed. Special topics: subjunctive and passive. Approximately 600 additional most frequent words and about 60 idioms to be mastered actively. Required reading, in English: about 100 pages on German culture and civilization. Heath's *Graded German Readers*, Books

VI-X read in class and approximately 100 pages outside. Oral and written exercises based on texts read.

Prerequisite: German 1a or one year of high school German.

2a. Third-Semester German.* I, II. **4 credits**

Some 200 pages of narrative and dramatic prose, read in class, and about 250 pages of intermediate grade outside. An additional 700 of the most frequent words and some 100 idioms to be mastered actively. Types of texts used in class: Bonsel's *Die Biene Maja,* Purin-Rose's *Kulturkunde,* Hofrichter-Stroebe's *Leicht und Neu.* Oral and written reproduction of material read.

Prerequisite: German 1b or two years of high school German.

2b. Fourth-Semester German.* I, II. **4 credits**

Some 300 pages of novelistic literature and lyrics read in class and some 300 pages outside. Additional 800 words in Purin's *Standardized German Vocabulary* to be mastered actively. Composition work based on the texts read. Types of texts used in class: Röseler's *Moderne Erzähler,* Hauptmann's *Einsame Menschen,* Keller's *Romeo und Julia auf dem Dorfe.* Oral and written reproduction of material read.

Prerequisite: German 2a or three years of high school German.

20. Classical and Modern Writers.* Yr. **3 credits each semester**

Reading, composition, and oral practice. Some 400 pages read in class and an equal amount outside. Types of texts used in class: Grillparzer's *Des Meeres und der Liebe Wellen,* Goethe's *Hermann und Dorothea,* Fleissner's *Der junge Goethe.* Outside reading: Storm's *Der Schimmelreiter,* Mann's *Tonio Kröger,* and Schiller's *Wilhelm Tell or Jungfrau von Orleans.*

Prerequisite: German 2a or equivalent.

25. Intermediate Composition and Conversation.* Yr. **2 credits each semester.**

Written exercises and grammar review, with discussion in German.

Prerequisite: German 2b.

Russian

1a. First-Semester Russian. I. **No credit**

Essentials of grammar with ample oral and written exercises. Text used: A. H. Semeonof, *A New Russian Grammar.*

1b. Second-Semester Russian. II. **No credit**

Reading of easy selections and stories, with practice in conversation on content of material read. Text used: A. H. Semeonof's *Grammar* (completed) and *A First Russian Reader* by the same author.

Polish

Szymon St. Deptula, M.A., Instructor in Polish.

1a. Elementary Polish.* I. **4 credits**

This is an introductory course for students with no previous knowledge of Polish. Practice in pronunciation is afforded through phonetic study and drill.

Declension of nouns, adjectives, and pronouns with constant review of vocabulary and grammar by means of dictation, quizzes, and drill constitutes the greater part of the semester's work.

1b. Second-Semester Polish.* II. **4 credits**

A continuation of Polish 1a, this course is designed for students without any previous formal knowledge of Polish grammar. Further practice in pronunciation is given through phonetic study and continuous repetition and correction. In grammar the verb is taken up, and the grammatical material of the first semester reviewed. The classwork consists of dictation, short quizzes, written and oral exercises, and daily drill in declensions and conjugations. Particular attention is paid to vocabulary-building exercises. Conversation and reading in easy Polish prose supplement the grammatical drill and review.

10a. Intermediate Polish.* I. **3 credits**

The content of the course includes a detailed review of declensions and conjugations; special drills in vocabulary and idioms, especially the current words not likely to be included in even the newest dictionaries; oral and written exercises and composition; simple conversation on everyday topics and current events; frequent quizzes in dictation, grammar, and translation; and collateral reading in fairly difficult Polish prose and poetry.

10b. Fourth-Semester Polish.* II. **3 credits**

This course continues the work of Polish 10a.

20a. Advanced Polish.* I. **2 credits**

This course is open to those who read Polish with ease and who are acquainted with the fundamentals of Polish grammar. The work in the courses consists of a final rapid topical review of grammar, with emphasis laid upon the theory and the "rules" that govern certain grammatical peculiarities of the Polish language. The reading includes the shorter prose fiction of Sienkiewicz, Reymont, and other outstanding masters. Original literary translations from the Polish into English—and vice versa—are prepared for publication.

The course is recommended to teachers of Polish, present or prospective, as well as to those who may be interested in mastering Polish thoroughly for business, professional, or cultural reasons.

20b. Advanced Polish.* II. **2 credits**

Course 20b continues the work of Polish 20a. Chief emphasis is placed upon conversational and colloquial Polish, translation of literary prose, and grammatical drill.

21. Conversational Polish.* I or II. **2 credits**

This is a practical course designed primarily to give the student the opportunity to improve his speaking ability in everyday Polish. No text is used. The course is conducted wholly in Polish. The student is afforded the maximum opportunity to speak the language since the class is run on the socialized recitation plan.

50. Masterpieces of Polish Literature.* I. **2 credits.**

The aim of this course is to acquaint the student, through lectures, discussion, and extensive reading, with the major masterpieces of classical Polish literature from the sixteenth century through the first half of the nineteenth. The course is conducted in Polish.

51. Modern Polish Literature.* II. **2 credits**

Course 51 is a sequel to Polish 50, given the first semester, but may be elected independently by those who have not had Polish 50 or its equivalent. The course consists of wide reading, reports, and lectures on the developments in Polish literature since 1863, with the emphasis placed upon the key works of such representative authors as Sienkiewicz, Prus, Wyspiański, Zeromski, Reymont, and Goetel.

60. Polish Literature in English Translation.* I. **1 credit**

The chief masterpieces of Polish literature from the Renaissance period through the first half of the nineteenth century that are available in good English translations are read and discussed. The class is conducted in English.

61. Modern Polish Literature in English Translation.* II. **1 credit**

The outstanding masterpieces of Polish literature of the last seventy years are read and discussed. Special attention is paid to the key works of representative authors, including the two Nobel laureates in literature, Sienkiewicz and Reymont. The social background of the works read is related to the contemporary scene in Poland in such a fashion as to bring out not only the purely Polish but also the universal traits and characteristics of mankind generally from a cosmic and ubiquitous point of view rather than solely from a local and nationalistic standpoint. The course thus affords the student an excellent opportunity to study and analyze at length in round-table discussions the work and the ideas of such Polish men of letters as the two Nobel laureates mentioned above and such other leading spokesmen for their generations as Prus, Wyspiański, Przybyszewski, Zeromski, Orzeszkowa, Weyssenhoff, and Goetel.

62. The Polish Short Story in English Translation.* I. **1 credit**

Course 62 is an introduction to the masters of the Polish short story and novelette, most of whom are available in competent English translation. Comparisons are drawn between the European and the American varieties of the short story, both commercial and artistic, with an attempt to arrive at some conclusions as to which is the more effective medium and why.

Two short stories, including one by Henryk Sienkiewicz, are read each week. Occasional critical papers are required.

63. The Contemporary Polish Short Story in English Translation.* II. **1 credit**

Course 63 introduces the student to the prolific short-story literature in Polish that is at present available in English translation. With the exception of the short stories of Reymont (around whom the course is organized), all stories are the work of living authors dealing with situations and problems that are universal and perennial. Emphasis is laid upon the social background

of the stories so as to tie up the narrative content with the contemporary scene in Poland.

64. The Polish Novel in English Translation.* I. **1 credit**

Representative Polish fiction of the nineteenth century is read and discussed.

65. The Modern Polish Novel in English Translation.* II **1 credit**

In this course wide reading is required in the outstanding masterpieces of Polish fiction of the second half of the nineteenth century and the first third of the twentieth. Short critical essays are also required from time to time.

101. Polish Romantic Literature of the Nineteenth Century.* I or II. **2 credits**

The course is designed to acquaint the student with the most brilliant period of Polish literature. The student reads widely in the masterpieces of the three greatest Polish poets: Mickiewicz, Slowacki, and Krasiński.

The course is recommended to those who read Polish with ease and wish to become acquainted with the chief poetic and dramatic works of Polish literature.

102. Sienkiewicz.* I. **2 credits**

Course 102 requires extensive reading in the representative short stories and novels of Henryk Sienkiewicz, the world-famous author of *Quo Vadis?*, awarded the Nobel Prize in Literature in 1905.

103. Reymont.* II. **2 credits**

Wide critical reading is required in the representative prose fiction of Ladislas St. Reymont, the outstanding Polish and Slavic novelist of the twentieth century, whose masterpiece, *The Peasants,* now translated into twenty-seven languages, was awarded the coveted Nobel Prize in Literature in 1924.

Romance Languages

Charles E. Young, Ph.D., Professor of Romance Languages, Chairman
Meta M. Steinfort, M.A., Associate Professor of Spanish
Mrs. Florence Stehn Reynolds, M.A., Assistant Professor of French (On leave I)
Robert Roeming, M.A., Instructor in French and Italian
Robert H. Weidman, Ph.D., Instructor in German and French
Ruth A. Miller, M.A., Instructor in Spanish (part-time)
Gertrude K. Stoessel, B.S., Instructor in French (part-time)

French

1a. First-Semester French.* I, II. **4 credits**

The primary object of this course is to teach the student to read simple French prose as a foundation skill to which other skills such as speaking, understanding, and writing may be added later. Grammar is presented from the recognition or French-English point of view. The book also includes the acquisition of a vocabulary of 500 words based on the Vander Beke work count, selected idioms from the Cheydleur list occurring in the texts read, pronunciation, ear training.

1b. Second-Semester French.* I, II. **4 credits**

The work of the preceding semester is continued with review of grammar, an additional 500 word vocabulary, continued study of idioms, the writing of simple French, oral and aural practice. Attention is given to the culture of the French people.

Prerequisite: French 1a or one year of high school French.

10a. Third-Semester French.* I, II. **3 credits**

The primary object of the course is to increase the reading ability acquired in the first year. The vocabulary of French 1a and 1b is reviewed, and the study of idioms based on the Cheydleur list is continued. There is also a review of irregular verbs and pronunciations. Grammar is reviewed and studied in connection with the texts read and as contributing to their better understanding. Opportunity is afforded for oral and aural practice. Students who expect to benefit most from the course are given an opportunity to do out-of-class reading.

Prerequisite: French 1b or two years of high school French.

10b. Fourth-Semester French.* I, II. **3 credits**

French 10b continues the work of Course 10a. Vocabulary study is continued with a second list consisting of 1000 words based on the Vander Beke word count. Attention is given to the literary aspects of the works read with a view toward establishing an appreciation of French literature.

Prerequisite: French 10a or three years of high school French.

15a. Elementary Composition and Conversation.* I. **2 credits**

This is a supplementary course to be taken usually with French 10a. Its purpose is to intensify the student's knowledge of the grammatical structure of the French language and its vocabulary through constant systematic drill. Emphasis is placed upon attaining proficiency in expressing ideas simply and correctly both orally and in writing. The course is not open to students who have had the equivalent of two years of college French, except by special permission.

15b. Elementary Composition and Conversation.* II. **2 credits**

This is a continuation of Course 15a. It is open to properly qualified new students.

21a. Elementary Survey.* I. **3 credits.**

French 21a is a third year course planned to cover French literature in outline, with illustrative readings from the principal periods, movements, and writers. The course includes a study of the literary aspects of the works read, and literary history. This course or its equivalent is prerequisite to all advanced courses in French literature.

Prerequisite: French 10a and French 10b or four years of high school French.

21b. Elementary Survey.* II. **3 credits**

This course is a continuation of Course 21a. It is open to properly qualified new students.

Italian

1a. First-Semester Italian.* I. **4 credits**

This is an introductory course for students who have not studied Italian previously. Attention is given to the acquisition of correct pronunciation and fluency in oral reading. The essentials of grammatical structure are taught by means of written and oral practice. Selections for reading of progressing difficulty, which serve as an introduction to Italian culture, are correlated with the study of the grammar. In addition, the mastery of selected idioms and of a vocabulary of at least 500 most frequent words, compiled from recognized word lists, is included.

1b. Second-Semester Italian.* II. **4 credits.**

Italian 1b continues the work of the first semester in developing those skills which are most important in acquiring a reading knowledge of the language. Essential principles of grammar are reviewed. Special attention is given to the writing of simple Italian, to oral practice, and to the study of selected idioms and vocabulary.

Prerequisite: Italian 1a or one year of high school Italian.

15. Elementary Composition and Conversation.* Yr. **2 credits**

This course is offered as an aid to those who have already studied or familiarized themselves with the Italian language. It includes a review of the grammatical principles through intensive written and oral drills. Further emphasis is placed upon the study of the vocabulary most representative of the activity of daily life.

Prerequisite: Italian 1b, its equivalent, or consent of instructor.

Spanish

1a. First-Semester Spanish.* I. **4 credits**

Spanish 1a includes careful training in pronunciation, much oral and aural practice, a study of the fundamentals of grammar, and the acquisition of a vocabulary of at least 500 words used in the oral work and reading and checked with the Spanish word and idiom lists. The reading of simple Spanish is started early in the semester. In addition, students are required to do outside reading in English on the history, life, and customs of the Spanish and Latin-American peoples.

1b. Second-Semester Spanish.* II. **4 credits**

Spanish 1b continues the practice in pronunciation and oral work, the study of grammar, and the acquisition of basic vocabulary and idioms. The reading of Spanish in class is supplemented by easy readings in the foreign language outside of class.

Prerequisite: Spanish 1a or one year of high school Spanish.

10a. Third-Semester Spanish.* I. **3 credits**

Spanish 10a continues the study of the Spanish people through the reading of a number of novels, short stories, and plays by the best modern authors. Oral and written work is based on the reading. There is a review

of grammar with additional finer points in syntax; also a further study of vocabulary and idioms.

Prerequisite: Spanish 1b or two years of high school Spanish.

10b. Fourth-Semester Spanish.* II. **3 credits**

Spanish 10b is a continuation of the work of Course 10a with an increase in the amount and degree of difficulty of reading. More extensive oral and written reproduction of content in Spanish is required.

Prerequisite: Spanish 10a or three years of high school Spanish.

16a. Elementary Conversation and Composition.* I. **2 credits**

This is a supplementary course to be taken with Spanish 10. It is not open to students who have had the equivalent of two years of college Spanish, except by special permission.

Prerequisite: Spanish 1b or equivalent.

16b. Elementary Conversation and Composition.* II. **2 credits**

This is a continuation of Course 16a. It is open to properly qualified new students.

Prerequisite: Spanish 16a.

21a. Elementary Survey.* I. **3 credits**

Spanish 21 comprises a brief study of the history and the development of all types of Spanish literature—the epic, the drama, prose writings, lyrics, the novel—covering the centuries from 1140 to the present. This study is centered around and illustrated by the reading and interpretation of representative works of each type.

Prerequisite: Spanish 10b or equivalent.

21b. Elementary Survey.* II. **3 credits**

This is a continuation of Course 21a. It is open to properly qualified new students.

MATHEMATICS AND ASTRONOMY

George A. Parkinson, Ph.D., Associate Professor of Mathematics, Chairman
William E. Roth, Ph.D., Associate Professor of Mathematics
Ross H. Bardell, Ph.D., Assistant Professor of Mathematics
Morris Marden, Ph.D., Assistant Professor of Mathematics
Louise A. Wolf, Ph.D., Assistant Professor of Mathematics
Edward A. Nordhaus, M. S., Instructor in Mathematics
Marion J. Turner, M.S., Instructor in Mathematics
Allison B. McCain, B.A., Instructor in Mathematics (part-time)
John I. Vass, Ph.D., Instructor in Mathematics
Howard Zoerb, B.S., Instructor in Mathematics (part-time)

The courses of the department are organized with the needs of three types of students in mind:

(1) Those interested in obtaining mathematical training for use in a future profession.

A good mathematical training is essential for all branches of engineering work; for physics, astronomy, chemistry, biometrics and ballistics, and for actuarial (insurance) and statistical work. It is also highly desirable as part of one's preparation for philosophy, or for the biological and social sciences.

(2) Those interested in mathematics from a cultural point of view.

This type includes those attracted to the subject by the importance, beauty, and interest of its material, as well as those who wish to become acquainted with the mathematical mode of thought. This mode of thought, which is fundamental for the exact sciences, is being employed to an increasingly greater degree in other fields of human endeavor.

(3) Those who wish to specialize in mathematics.

For all these students the department recommends the study of analytic geometry (Mathematics 2 or 3) followed by the calculus (Mathematics 5a and 5b or 54 and 55) as a minimum introduction to modern mathematics. Mathematics 2 and 3 are open to students who have had four semesters of algebra in high school, or three semesters of algebra and Mathematics 31, or two semesters of algebra and Mathematics 1a and 1b.

For the first two types of students the department suggests the further study of Mathematics 110, 112, or 117 and for the last two types Mathematics 6, 101, 103, and 119. Mathematics 6 is a required course for majors in mathematics. Mathematics 112 is required for majors in physics-mathematics and may be taken by mathematics majors.

1a. Algebra.* I, II. **4 credits**

This course presents the principle of function, graphing, the solving of equations of higher degree and systems of simultaneous equations, the theory and use of logarithms, and the derivations and applications of algebraic formulas.

Prerequisite: One year of high school algebra.

1b. Algebra and Trigonometry.* I, II. **4 credits**

Course 1b is a continuation of 1a and presents the following topics in algebra: mathematical induction, the binomial theorem, complex numbers, the theory of equations, permutations and combinations, probability, and determinants. The trigonometry includes definitions of the trigonometric functions, identities, trigonometric equations, and the numerical solution of triangles.

Prerequisite: Mathematics 1a or two years of high school algebra. Students who have had trigonometry are not eligible to receive credit in Mathematics 1b.

31. Algebra.* I, II. **4 credits**

In addition to the topics in Mathematics 1a, this course takes up probabilities, permutations and combinations, inequalities, ratio and proportion, variation, and determinants.

Prerequisite: Three semesters of high school algebra.

Students who have taken two years of algebra in high school or Mathematics 1a will not receive credit in Mathematics 31.

2. Trigonometry and Analytic Geometry.* I, II. **4 credits**

About a third of this course is devoted to the study of the trigonometric functions which are important not only in determining the exact relations among the sides and angles of a triangle, but also in describing quantitatively all sorts of periodic phenomena in nature. Trigonometry is also needed for many branches of higher mathematics including analytic geometry.

The remainder of the course is the same as Mathematics 3.

Prerequisite: Four semesters of high school algebra or Mathematics 31, or a grade of "A" in Mathematics 1a.

Note: Chemistry course students normally take this course after completing Mathematics 1a or its equivalent.

3. Analytic Geometry.* I, II. **3 credits**

Analytic geometry is the study of geometrical problems by algebraic methods and of algebraic problems by geometric methods. In addition to the straight line and circle, the curves studied in detail are the ellipse, parabola, and hyperbola. There is also a brief treatment of the general equation of a conic.

Prerequisite: Mathematics 1b or two years of high school algebra plus trigonometry. May not be taken for credit by students who have taken or are taking Mathematics 2.

5a.[1] Differential Calculus.* I, II. **4 credits**

All majors and minors in mathematics and in the physical sciences are required to take calculus for one year. Letters and Science students may meet this requirement by taking Mathematics 5a and 5b or 54 and 55.

Prerequisite or co-requisite: Mathematics 2 or 3.

5b.[1] Integral Calculus.* I, II. **4 credits**

Prerequisite: Mathematics 5a.

For Courses 51, 52, 54, and 55, which are open to Letters and Science students, see pages 65 and 66.

6. Determinants and Analytic Geometry of Space.* II. **3 credits**

In this course analytic properties of surfaces and of space curves are studied. The theory of determinants is developed and is used freely throughout. Majors in mathematics are required to take this course.

Prerequisite: Mathematics 5a or 54 or concurrent registration.

7. Theory of Investment.* I, II. **4 credits**

This course is required of all Commerce students and may be chosen as an elective by Letters and Science and Engineering students. The purpose of this course is to provide the student with a thorough mastery of the theory and practice of simple and compound interest and annuities as applied to amortization of debts, sinking funds, depreciation, bonds, and life insurance.

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[1] Chemistry course students take 5a and 5b for 3 credits.

Prerequisite: Mathematics 1a or 31 or 51, or two years of high school algebra.

This course does not count as a part of the B.A. or Ph.B. optional requirement except for students who graduate in Commerce.

101. Advanced College Algebra.* Yr. **3 credits each semester**

Course 101 covers permutations and combinations; interpolation, differences, summation formulae; determinants, matrices, linear dependence, elimination; partial fractions; continued fractions.

Actuaries, engineers, teachers, and others will find this course of special interest.

Prerequisite: Calculus or concurrent registration in Mathematics 5b or 55.

103. Advanced Geometry.* Yr. **3 credits each semester**

In this course the methods of elementary analytic geometry are extended to the analytic and synthetic projective geometry of the plane. Some of the subjects discussed are: linear equations and linear dependence; homogeneous Cartesian coordinates; harmonic division; line coordinates; cross ratio; transformations; and metric geometry of the complex plane. The principles developed in the early part of the course are applied to rectilinear figures and conic sections.

Prerequisite: Mathematics 6 or consent of instructor.

111. Review of Calculus.

For description, see page 66.

112. Differential Equations.* II. **3 credits**

Not to be taken by mathematics majors. For description, see page 67.

117a-b. Vector and Tensor Analysis.* Yr. **4 credits**

For description, see page 67.

119. Introduction to Differential Geometry.* II. **3 credits**

Course 119 provides an introduction to the differential geometry of space curves, curves and surfaces associated with space curves, and the fundamentals of the theory of curved surfaces. The Vector Method of presentation is used because of its simplicity and effectiveness. Since the necessary vector analysis is presented at the beginning of the course, a previous course in vector analysis is not required. The student should have completed or should be concurrently registered in a course in the analytic geometry of three dimensions. The course is especially recommended for mathematics majors and minors. Other students should obtain the consent of the instructor before registering.

Astronomy

17. Survey of Astronomy.* II. **3 credits**

The object of this course is to give the student an understanding of the problems which confront the astronomer and of the methods by which these problems are attacked. Some of the subjects considered are: the optics of the

telescope; the solar system; motions and physical properties of the stars; galactic systems. Observational work will be arranged.

The course is open to freshmen.

6. Navigation.* II. **2 credits**

For description, see page 67.

PHYSICS

Miles J. Martin, Ph.D., Professor of Physics, Chairman
T. Alton Rouse, Ph.D., Assistant Professor of Physics
Earl R. Bell, M.A., Instructor in Physics

1a. General Physics.* I. **5 credits**

Two hours lecture-recitation; two hours quiz; four hours laboratory.

Lab. fee, $7.

The following subjects are treated: mechanics, heat, magnetism, and static electricity. The course is open to any Letters and Science student.

1b. General Physics.* II. **5 credits**

Two hours lecture-recitation; two hours quiz; four hours laboratory.

Lab. fee, $7.

The following subjects are treated: current electricity, sound, and light. Students entering the second semester who have had high school physics may take this course with the consent of the chairman of the department.

Prerequisite: Physics 1a.

7. Photography.* II. **2 credits**

One hour lecture-recitation; three hours laboratory. Lab. fee, $4.50.

This course deals with the science of photographic processes. Laboratory work consists of experiments in exposure, developing of negatives, making of prints, enlarging, and other photographic techniques.

Prerequisite: Consent of instructor.

119. Radiation, Ultraviolet to Infrared.* I. **1 credit**

The course consists of a series of lectures on the physical nature of light with particular reference to ultraviolet, infrared, and X-rays, and their present day applications. The course should be of interest to medical students, nurses, and the general public. It should be of interest to the public because of the increasing role that radiation of all kinds is playing in modern life.

Prerequisite: Physics 1b or equivalent.

POLISH, see page 90.

PSYCHOLOGY

Lynn E. Baker, Ph.D., Instructor in Psychology

1. Introduction to Psychology.* I, II. **3 credits**

This is an introductory survey of psychology designed to acquaint the student with the basic concepts, laws, and materials useful in the description of human behavior. The historical and experimental approach is used through-

out, covering such subjects as: historical bases of modern psychology, the origins of behavior, intelligence and adjustment, the receptors and sensation, learning, social behavior, and personality development.

Prerequisite: Sophomore standing.

100. Seminar in Problems in General Psychology.* I, II. 1 credit

This is a discussion and reading course in which the student is permitted to follow a line of study which may be of particular interest to him.

Prerequisite: Psychology 1 and instructor's permission.

106. Abnormal Psychology.* I. 3 credits

This course in psychology is designed to interpret the normal personality by reference to the psychoneurotic and psychotic patterns. The major clinical forms of psychopathology are covered in addition to such normal phenomena as sleep and dreams, and hypnosis. Therapy is suggested wherever possible.

Prerequisite: Psychology 1, and consent of instructor.

10. How to Study. I, II. No credit

This is a laboratory course devoted to the establishment of effective study habits. An intensive study is made of principles underlying academic work such as budgeting time, efficient reading, recitation methods, note making, and organization of knowledge. Extensive practice is given in the skills involved.

The course is open to any freshman or sophomore and requires no fee.

Business Psychology, see page 53.

RUSSIAN, see page 90.

SOCIOLOGY AND SOCIAL WORK

Philip H. Person, Ph.D., Associate Professor of Sociology, Chairman

1 Introductory Sociology.* I. Day class—3 credits; Evening class—2 or 3 credits

This is an introductory course to the study of sociology and is required of students majoring in sociology. The course deals with the environmental, racial, and psychological foundations of society. A study is made of the fundamental social institutions and of how these institutions adapt themselves to the demands of changing conditions of life and living. The lectures, readings, and discussions are planned to make clear the nature of the organization of our social structure and the means by which the members of society are controlled and directed.

Prerequisite: Sophomore standing.

2. Introductory Sociology.* II. Day class—3 credits; Evening class—2 or 3 credits

This course deals with the nature of social change and the problems of social adjustment; problems of population; eugenics; race relations; problems of the family; changing status of women and children; social hazards of industrial life; group conflict; war; dependency and correction; problems of socialization. The lectures, readings, and discussions are planned to reveal how the social order is constantly changing and in what direction sound adjustments are tending.

Prerequisite: Sophomore standing.

139. Social Psychology.* **2 or 3 credits**

In our modern world of increasing complexity, human behavior varies directly with increasing participation in a variety of group ideas and social situations.

Social behavior, as related to emotions, habits, fantastical and objective thinking on the one hand, and to prejudice, mental epidemics, propaganda, mobs, crowds, audiences, on the other, is analyzed.

Prerequisites: Psychology 1 and junior standing, or junior major in sociology.

141. Poverty and Dependency.* I. **2 or 3 credits.**

Course 141 is designed for social investigators, teachers, and others interested in social welfare. The course offers training and credit for those who qualify and are interested in entering the field of social work. The subjects taken up include: the extent of poverty and pauperism; cause of poverty and dependency; historical methods of dealing with dependents; epileptic, dependent children; preventive agencies and methods.

Prerequisites: For Sociology majors, Sociology 1 and 2 or concurrent registration in Sociology 1; for others, junior standing or concurrent registration in Sociology 1.

160. Family and Marriage.* **2 credits**

The following subjects are covered: The effect of social and economic changes on present-day marriage and functions of the American family; contributions of some of the newer psychological insights into marriage problems; trends in marriage and in family disorganization, and their control.

Prerequisite: For sociology majors, one course in sociology or anthropology; for others, junior standing.

161. Criminology and Penology.* II. **2 or 3 credits**

This course deals with crime and criminals: extent, cost, causation, punishment and treatment, institutions, probation and parole, and the courts.

Special attention is given throughout to the problem of juvenile delinquency and its bearing on the problem of crime as a whole.

Prerequisites: For sociology majors, Sociology 1 and 2 or concurrent registration in 2; for others, junior standing or concurrent registration in Sociology 2.

144. Contemporary Social Movements in American Life.* **2 credits**

Which of the various social movements of our times such as socialism, labor unionism, fascism, communism, the Cooperative Movement have the most to offer to our present-day society, sorely pressed by change and unrest? It is the purpose of this course to examine these movements critically from all points of view to enable the student to evaluate them better.

Since the Cooperative Movement both here and in foreign countries is in a phase of rapid growth, special attention is given to evaluation of the movement.

This course is substantially equivalent to Sociology (Economics) 144 in residence. Students having had one course may not take the other for credit.

Prerequisites: For sociology majors, Sociology 1 and 2, or senior standing.

163. Population Problems.* **2 credits**

This course deals with the trends in population growth in numbers, age, and sex classifications and their distribution; the trend of birth and death rates; population pressure; prospects of food supply; conquest of disease; and related topics.

Prerequisite: Junior standing.

SPANISH, see page 95.

SPEECH

Raymond H. Myers, M.A., Assistant Professor of Speech.

1. Fundamentals of Speech.* I. **3, 2, or 1 credits**

Lab. fee, $1.00.

For one credit, the lecture course is designed to give the student an understanding of the speech function and the principles of effective speech.

For two credits, the recitations are devoted to practice, analysis of individual performance in speech, and suggestions for improvement.

For three credits, the recitations and lectures are as described above.

Students who expect to take further work in the department should elect Speech 1 in their sophomore year if possible. Not more than three credits may be earned in any combination of Speech 1 and Speech 7, and such combination must include the lecture hour of Speech 1.

Prerequisite: Open to all students except freshmen.

2. Fundamentals of Speech.* II. **3 credits**

Continuation of Speech 1, which is prerequisite.

7. Public Speaking. I, II. **No credit**

For description, see page 56.

8. Extempore Speaking.* Yr. **2 credits each semester**

Required of freshman physical education men. For description, see page 72.

9. Parliamentary Practice.* I. **2 credits (non-credit with permission)**

In this course careful study is made of rules of procedure. There is a maximum amount of actual practice in conducting meetings. Satisfactory completion of the course should enable the student to preside over, or to take an intelligent part in, any organized meeting.

Prerequisite: Sophomore standing or consent of instructor.

16. Elements of Dramatic Expression and Acting.* I. **2 credits**

This course treats of the elementary principles of creative dramatic thinking in both the preparation and interpretation of material for the stage. Rhythmics, poise, motion, freedom, control, character analysis, elemental emotions and their portrayal, voice and diction, stage technique, and pantomime are stressed.

Prerequisite: Sophomore standing or consent of instructor.

707. Advanced Public Speaking. I, II. **No credit**

For description, see page 56.

708. Persuasive Speaking. I, II. **No credit**

For description, see page 56.

710. Radio Speaking. I, II. **No credit**

For description, see page 56.

ZOOLOGY

Joseph G. Baier, Jr., Ph.D., Associate Professor of Zoology, Chairman
Merlin L. Hayes, Ph.D., Instructor in Zoology and Botany

The laboratory science requirement may be removed by taking Animal Biology 1 and Zoology 104, or Animal Biology 1 and Botany 1, or Botany 1 and Botany 2. If Animal Biology 1 and Botany 1 are chosen to satisfy the science requirement, either one may precede the other, at the student's discretion.

1. Animal Biology.* I, II. **5 credits**

Two hours lecture; two hours quiz; four hours laboratory. Lab. fee, $8.00.

This course is preliminary to all advanced work in Zoology. A study is made of biological principles as illustrated by animals. The cell theory, adaptations, classification, morphology and physiology of organ systems, embryology, heredity, and evolution are considered. The laboratory work includes the anatomy, physiology, embryology, and histology of the frog, and comparative studies on protozoa and hydra.

This course combined with Zoology 104, or with Botany 1, satisfies the natural science requirement.

104. Comparative Anatomy of Vertebrates.* II. **5 credits**

Three hours lecture; six hours laboratory. Lab. fee, $10.00.

The lectures compare the structure and development of the organ systems in the different vertebrate groups, including physiology wherever advisable. Special reference is given to the comparison and evolution of the organ systems. The laboratory work includes the dissection of the shark, the mud puppy, and the cat, with comparative references to other vertebrates, including man.

Prerequisite: Animal Biology 1.

Limited enrollment. Students with a grade below C in Zoology 1 not admitted except by permission of the department.

106. Heredity and Eugenics.* I. **2 credits (noncredit by permission)**

Two hours lecture; one hour quiz.

This course includes a comprehensive study of the principles of heredity, their application to man, and their significance in the improvement or deterioration of the human race.

Prerequisite: Sophomore standing, or consent of instructor.

107. Organic Evolution.* II. **2 credits (noncredit by permission)**

Two hours lecture.

This course takes up the field of evidence and the theories supporting organic evolution.

Prerequisite: Sophomore standing, or consent of instructor.

CORRESPONDENCE-STUDY COURSES

The Correspondence-Study Courses offered by the University of Wisconsin, from Madison, provide individual instruction adapted to the special needs of each student. These courses, prepared and conducted by members of the University faculty, may be undertaken in the student's leisure hours at his home. Through them the University and the home are brought into close relationship; and through them also everyone in the state is given an opportunity to obtain the highest education possible at the smallest practical expense. They may be grouped as follows:

Regular university studies, which may be taken for credit toward a degree.

Advanced courses designed to help graduates and others already in professional or practical life to keep in touch with the advancement in science and other fields of knowledge.

High school preparatory studies for those for whom residence study is not available or practical.

Vocational courses which supply knowledge and training in business, industrial, and professional fields.

Elementary and grammar school studies for adults who need such instruction for practical purposes.

Over 400 courses are offered, some of which are listed below:

GENERAL
- Astronomy
- Botany
- Chemistry
- Comparative Literature
- Economics
- Education
- English
- French
- General Science
- Geology and Geography
- German
- Greek
- High School Subjects
- History
- Home Economics
- Italian
- Landscape Design
- Latin
- Library Methods
- Mathematics
- Music

GENERAL (contd.)
- Pharmacy
- Philosophy
- Physics
- Political Science
- Psychology
- Scandinavian
- Sociology
- Spanish
- Speech

BUSINESS
- Accounting
- Banking and Finance
- Business Correspondence
- Business Ethics
- Business Law
- Management

ENGINEERING
- Aeronautics
- Alternating Currents
- Architectural
- Automotive

ENGINEERING (contd.)
- Concrete
- Diesel Engines
- Drafting
- Freehand Lettering
- Heat Power Engineering
- Heating and Ventilating
- Hydraulics
- Machine Design
- Mathematics
- Mechanism
- Radio
- Refrigeration
- Shop Sketching
- Show-Card Writing
- Storage Batteries
- Structures
- Surveying
- Telephony
- Watthour Meters

For detailed information, call at the University Extension Division, The University of Wisconsin, 623 West State Street, Milwaukee, Wisconsin, or telephone Marquette 7051.

Or write to the University Extension Division, the University of Wisconsin, Madison, Wisconsin.

UNIVERSITY OF WISCONSIN
UNIVERSITY EXTENSION DIVISION

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BUREAU OF BUSINESS INFORMATION: (In co-operation with the School of Commerce.) Equipped to answer inquiries on a wide variety of business subjects.

(Information and bulletins sent free on request)

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